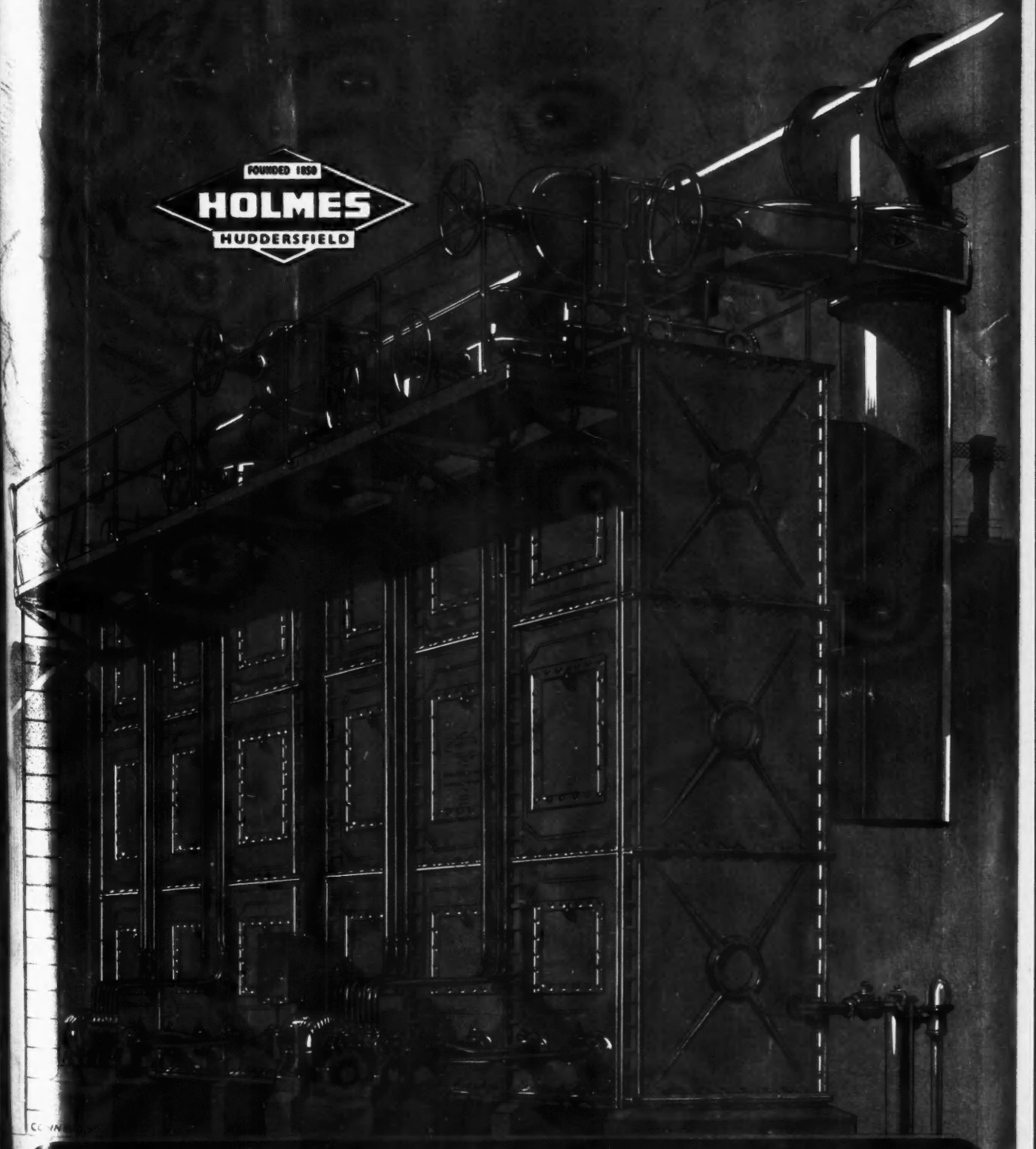
Gas Journal

Vol. 254. 100th Year. LONDON, JUNE 23 1948. No. 4438. Price 1/-



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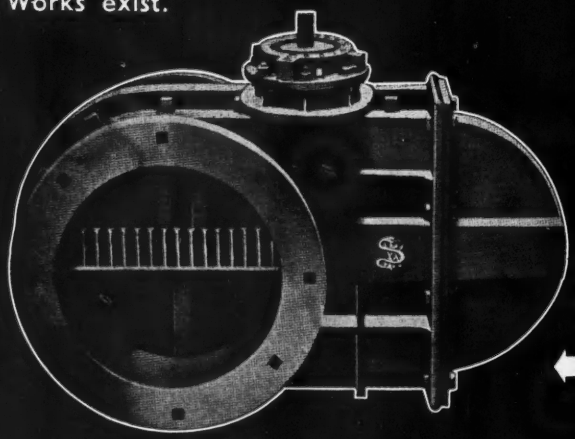

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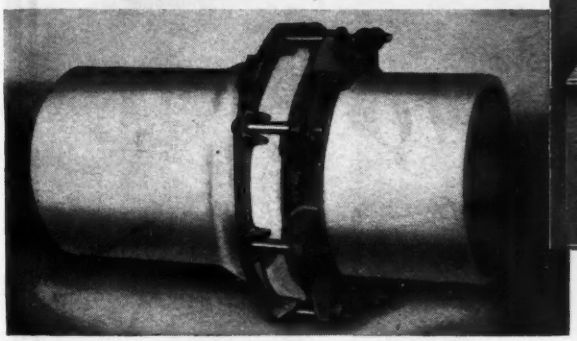

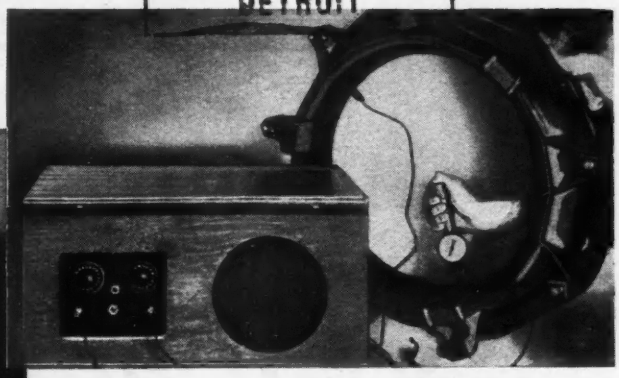

N°1. STRENGTH

The efficiency of any clamp depends upon continuous, uniformly high gasket pressure all around the bell face and the spigot of the pipe . . . and the SEALOMETER (shown in use above) was specially developed to determine this factor. It gives conclusive proof that DRESSER CLAMPS, by virtue of their unique design, the continuous recess of the scientifically sectioned gasket and the high quality materials used in their construction, offer unequalled strength with a corresponding immunity from costly repairs.

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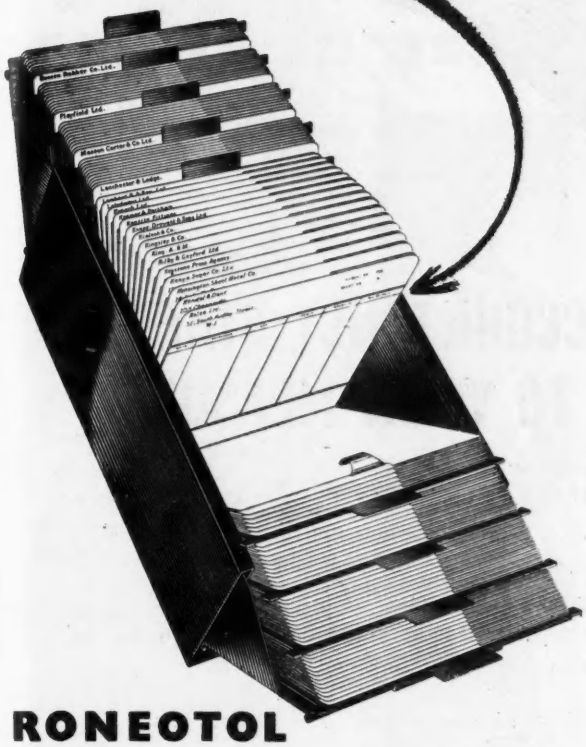

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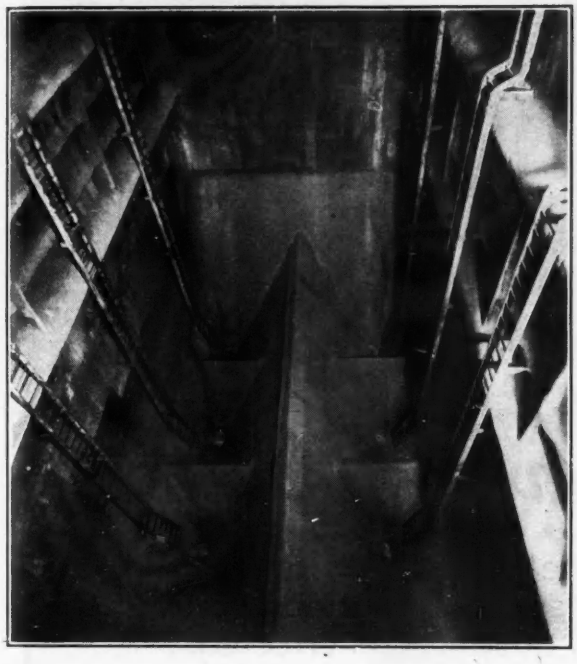

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have particular value.

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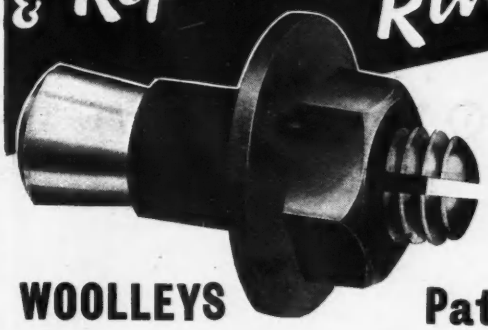
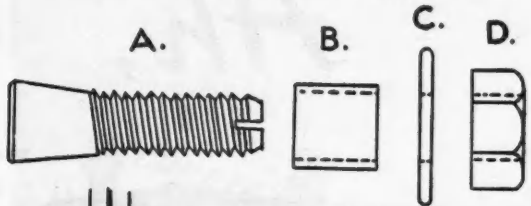
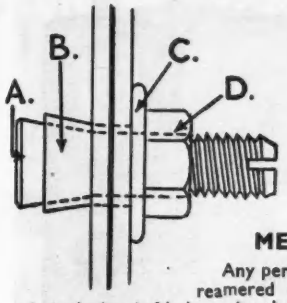


TO PLUG
⅜"
7/16"
½"
Diam. Hole

WOOLLEYS Patent CASHOLDER REPAIR BOLTS





A. Taper Headed Screw, nicked for Turnscrew to prevent bolt turning whilst fixing.
B. Annealed Tubular Sleeve, sliding fit over thread of screw.
C. Washer, also sliding fit over thread of screw.
D. Nut for forcing the tubular sleeve over the taper head of bolt, making an effective metal to metal joint.

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Yes, that's it!

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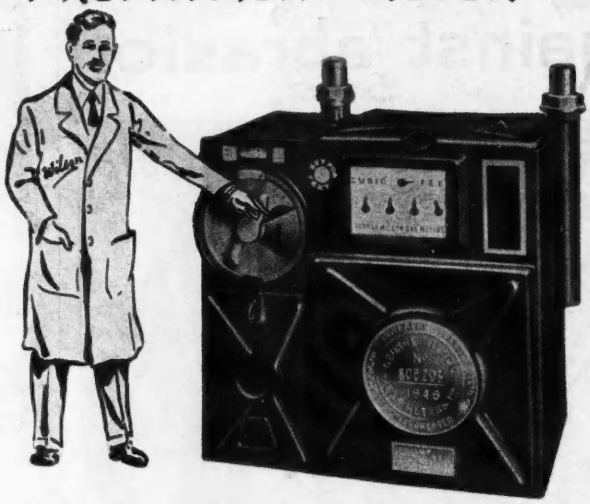
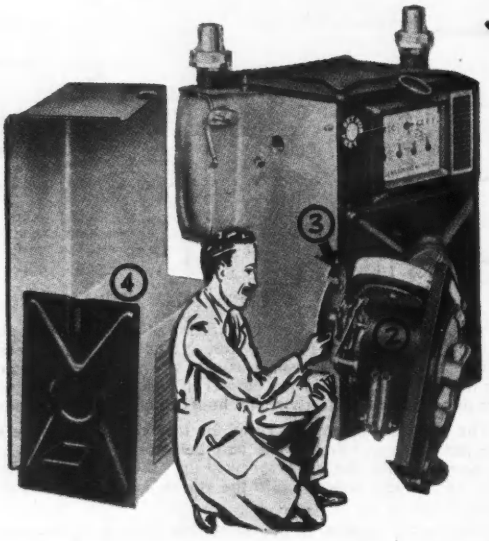


① The coin is put in this single slot..... but we will explain further.

Ah, that's better



The handle is turned in a clockwise direction and „payment in advance" is effected.

② This is the two coin optional attachment of extreme simplicity, proved design and robust construction.

③ That is the Wilson Compensating Cam.

④ This is the Cash Box, designed to hold over 500 pennies for the D.1 meter.

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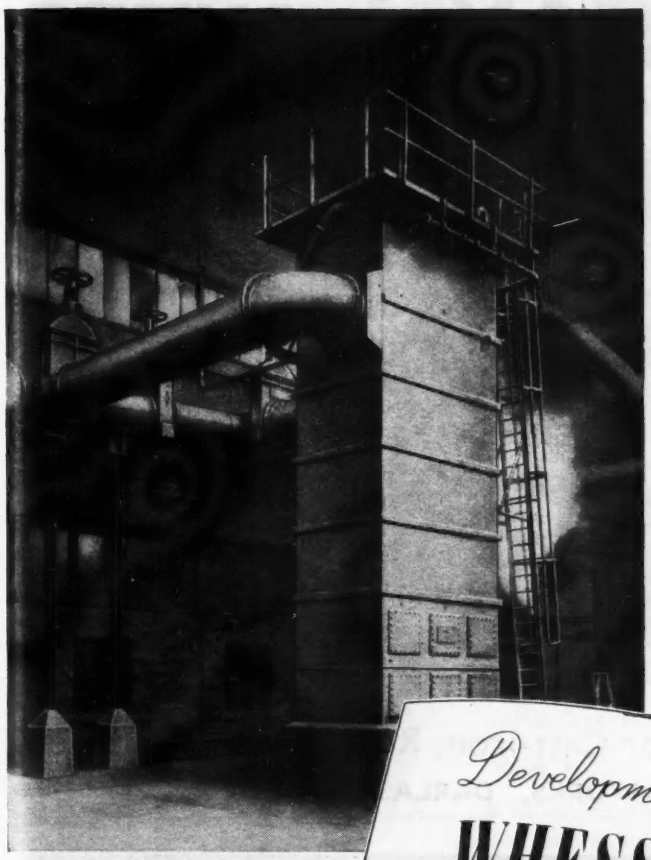

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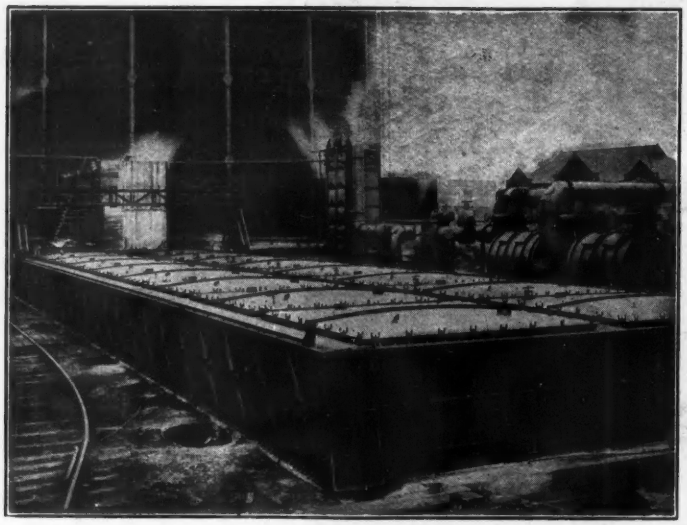

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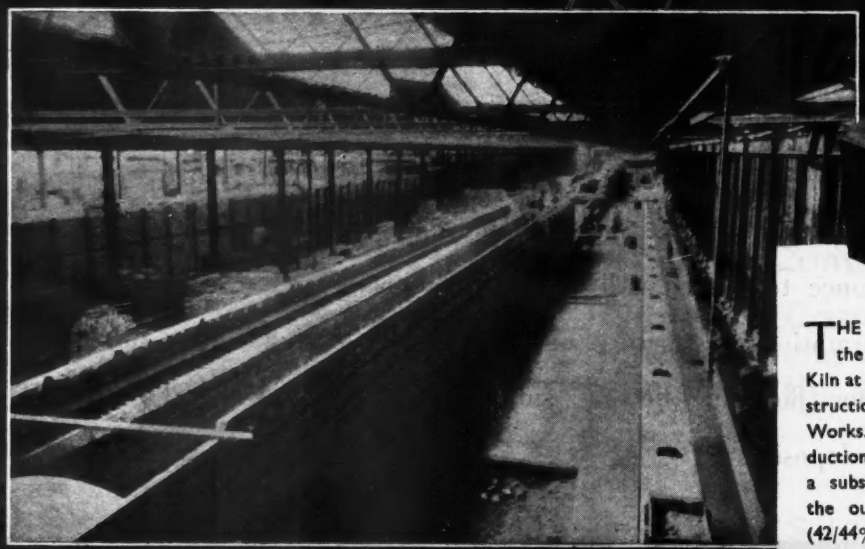

THE illustration shows the large new Tunnel Kiln at present under construction at our Manuel Works. When in production this kiln will give a substantial increase in the output of "Nettle" (42/44% Alumina) Firebricks.

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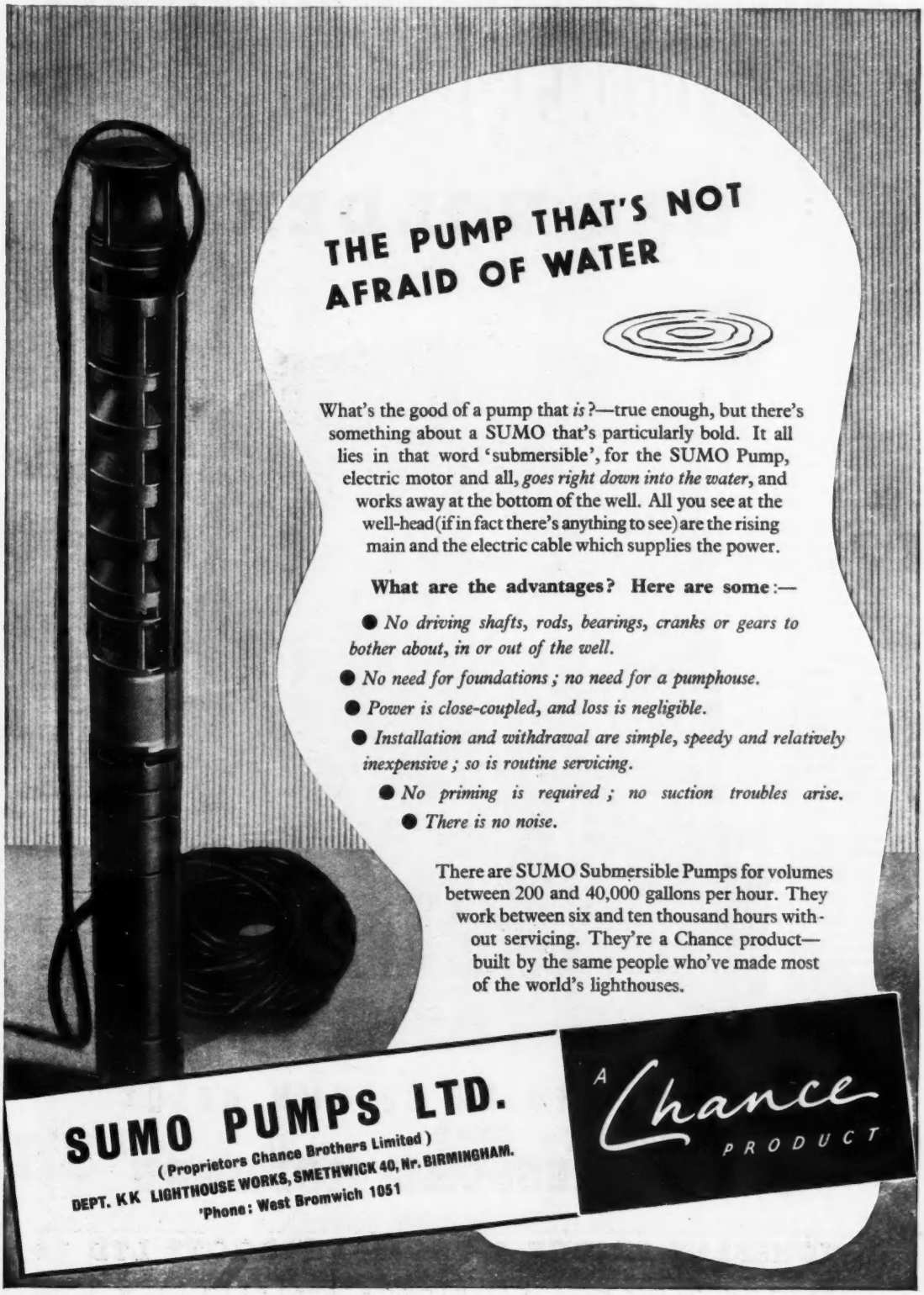

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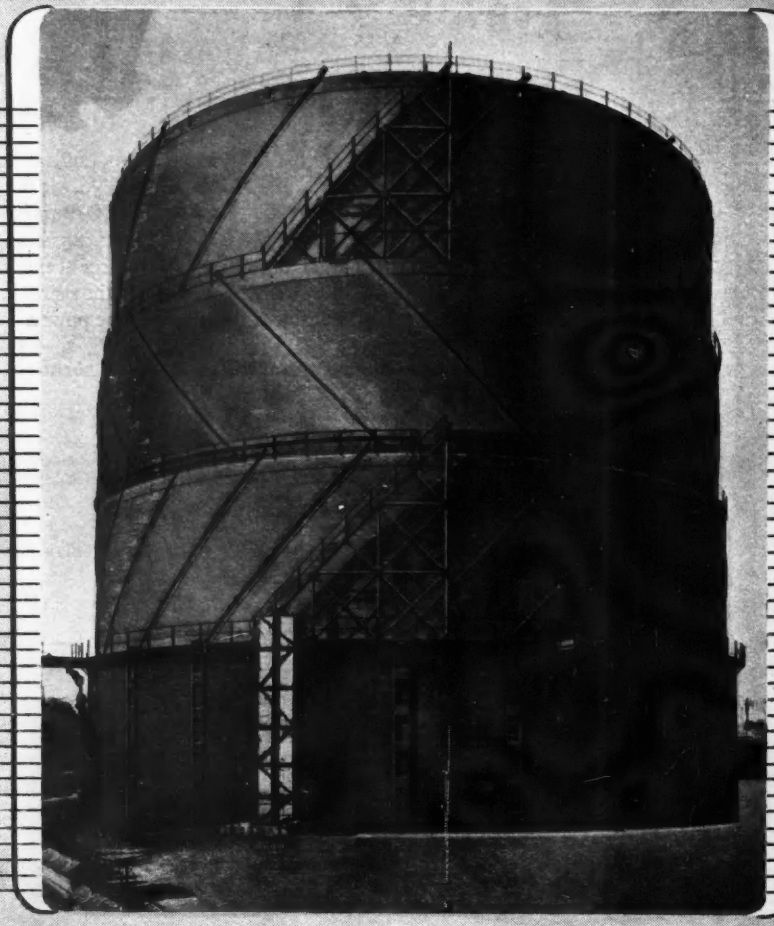

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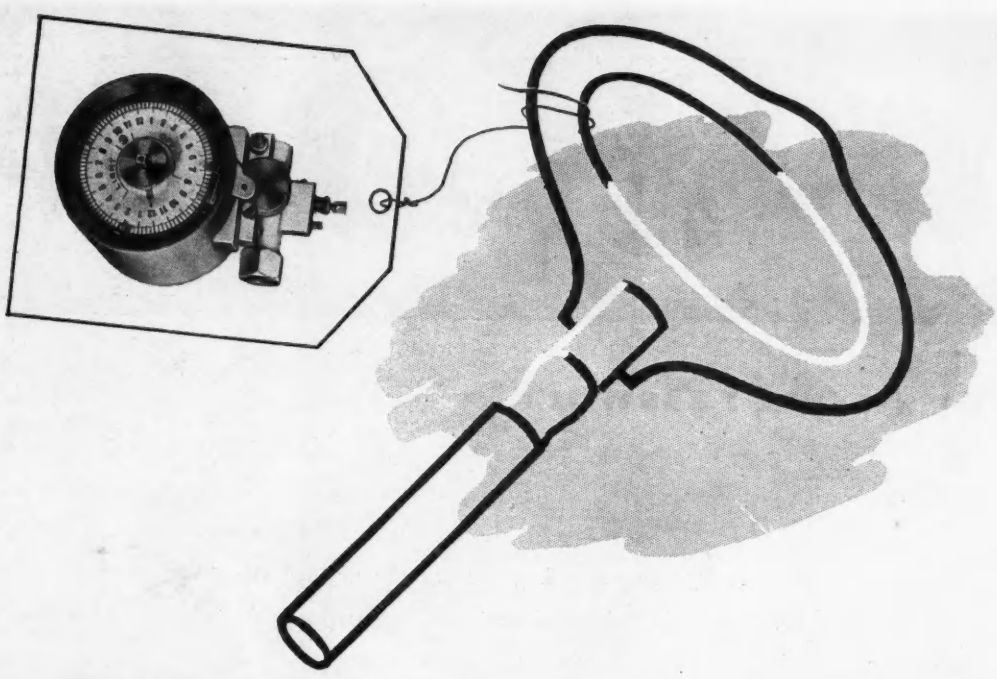

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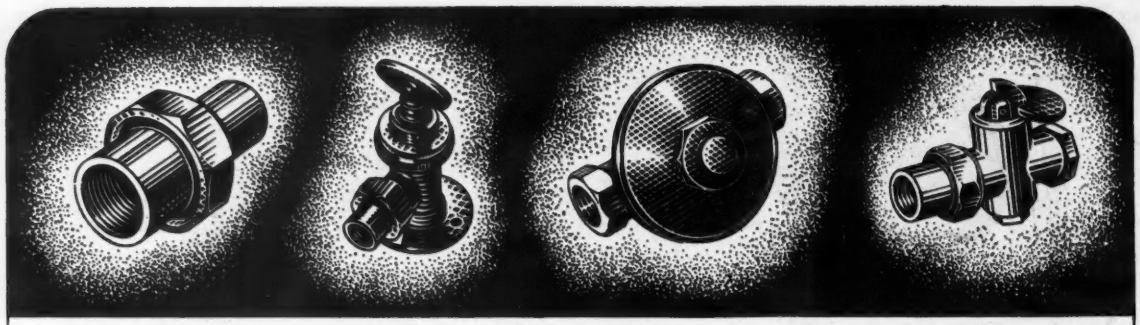

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GAS JOURNAL

Vol. 254 June 23, 1948 No. 4438

BROAD ISSUES

THE paper by Professor Brender à Brandis on the development of gas in the Netherlands, given to the Institution of Gas Engineers on June 8 and published in full in our Institution Number last week, is a very welcome contribution, and as we anticipated it gave rise to a discussion of great value in which authoritative opinions were freely and clearly expressed. The whole paper has, of course, special significance in view of the nationalization, and the planning under nationalization, of the British gas industry. Chief theme in the discussion (also published in full in our issue last week) was the advisability or otherwise of concentrating gas manufacture in what we may term super-stations, and of transmitting gas over considerable distances from a relatively few, but very large, central works. As Mr. F. M. Birks emphasized, concentration of gas production in a few large units is inevitably bound up with the problem of transmission ; and fundamentally the distances which are economic are almost proportional to the calorific value of the gas. Mr. Birks put forward the view that about 50 miles is the economic limit of transmission in this country, this figure being based on the differential in the cost of gas made from rail-borne and sea-borne coal ; and this distance becomes less the nearer the demand for gas is to the coal-fields. On this assumption there would appear to be little incentive to concentrate gas manufacture in a few super-stations.

Concentration of manufacture is more an economic than a technical problem ; the economies resulting from manufacture in large central stations may be quickly dissipated in increased distribution costs. To-day the cost of compression over considerable distances is a very important factor. Colonel W. M. Carr referred to investigations he had made into the cost of linking-up where gas has had to be conveyed through rural and semi-rural areas. In some instances he has found that the resulting increased cost in the holder at the receiving station would be as much as 100%, even allowing for the lower cost of production at the larger station. Colonel Carr's over-riding contention is that the soundest planning can be carried out only by areas, and that the primary factors affecting the economics of integration are location of the coal supplies and of coke markets, to which may be added density of population and present and potential industrial gas loads. He roundly asserted that the Ruhr gas grid, if constructed on the basis of to-day's values, would be quite uneconomic, and that the development of that grid was determined largely by political and other factors rather than by the economics of gas supply. "Our plans for integration in this country," said Colonel Carr, "must start, not at national level"—as was suggested by Professor Brandis for the Netherlands—"but by district and area methods, and the build-up of every unit which at present exists must be surveyed, and investigations made as to its potential industrial and domestic load. No scheme should be embarked upon until its economics are proved from the point of view of cost to the consumer."

Installation of coke oven plant was touched upon by Mr. F. B. Richards, who mentioned the popular fallacy that if one installs coke ovens in a gas-works one produces oven coke. The fact remains that if we wish to produce a coke which will be accepted by the market as oven coke we must duplicate the supply of coal which has enabled oven coke to be produced in the coking industry. This does not as a rule fall within the region of coal supply which has customarily been associated with the gas industry in this country. In planning any large extension of the use of coke ovens for the production of town gas it is necessary to visualize the effect of creating a largely increased demand for the type of coal which has been used in this plant in the past. Again, the gas industry should be flexible ; it should not, as seemed to be suggested by Professor Brandis, be tied to a large-scale chemical factory which, to be efficient, must be largely inflexible. And Mr. Richards added that he had so far seen no evidence in this country that overall economy is to be found by utilizing a process such as, say, the Lurgi process. The gas industry, at any rate for some time to come, should regard itself as a two-fuel industry. If we accept that, then the distribution of coke becomes a matter of equal importance with the distribution of gas.

CHANGES IN LOCAL STRUCTURE

"IN the gas industry you have had for many years a strong tradition of service to the consumer, and that is something that is going to be immensely valuable in the new set up. . . . You have had to cope with an enormous expansion in the demand for gas at a time when it was practically impossible to increase your capacity. I know only too well the difficulties with which you have had to contend. . . . I know how, to-day, the shortage of steel is impinging on you ; nevertheless, service to the consumer has, except in a negligible minority of cases, been maintained throughout, thanks to the devoted service of the people in the industry." We quote this from the sympathetic speech of the Minister of Fuel and Power, Mr. Hugh Gaitskell, at the President's Luncheon during the meeting of the Institution of Gas Engineers. A lengthy report of his remarks appeared in our columns last week, but we would like to call attention to and to emphasize Mr. Gaitskell's comments on decentralization, which appears to us to be one of the essential features to the success of the plan for the nationalization of the gas industry. The Minister said that it was a misconception to attach too much importance to the number and size of the Area Boards. These Boards would almost certainly feel that they ought to have sub-units or areas of management. They would have to make out and apply the appropriate structure for their own area requirements. He

was not, of course, suggesting any dictation, but there was no reason for anticipating over-centralization, and he added that it was easy to have a small area with an over-centralized structure within it. On the other hand, a large structure could be characterized by a highly de-centralized arrangement within it.

Local needs can best be met by the operation of reasonably small management units. Not that there will be no change in local structure under nationalization. The major change is that many people who have hitherto been working largely on their own will in future be working in a larger team. This may, probably will, need adjustment of outlook, but provided individuality and responsibility are encouraged rather than the reverse, that initiative is not submerged by innumerable forms and petty restrictions hindering the practical working of a common policy under decentralization, there are grounds for optimism rather than for gloom in the the Minister's comments.

THE ART OF GAS PRODUCTION

THE object of this year's Institution papers was to "show the present state of the art of gas manufacture and supply and to give some indication how progress might be effected." From this point of view Messrs. T. C. Finlayson and F. S. Townend were completely successful. Describing the framework within which the gas industry has developed in Great Britain they put first the coals available, second the demand for uninterrupted supply of gas of constant quality, third the demand for coke—"a growing demand for an alternative solid fuel to coal." Just what does this third demand mean? Is it suggested that any considerable fraction of the public really wants to put anything in the open grate except coal? But perhaps that is not meant. At any rate, as these writers say, the economic aspect of the industry in relation to the general fuel market is in a state of confusion. Both coke and gas are being used in many instances for no other reason than that coal is not available —or that it is as well to stock it up for next winter!

The survey of coals used in the industry is very brief—but long enough in view of the more thorough treatment by Dr. J. G. King of the whole subject. At the outset there is a curious omission, an omission fully made good when the authors came to discuss coke quality. We mention it here because it must never be forgotten that the ash content of the coal is decisive in fixing the quality of coke from this point of view. No operation, subsequent to the cleaning of the coal, can have any material effect on this property of the coke.

The present state of the art is admirably depicted. Half the gas made direct from coal—one hesitates to say, half the coal gas—is made in the continuous vertical retort. It is true that this type of plant orginated in this country, the origin of gas manufacture itself. But then so did the horizontal retort. We are sometimes too modest. We forget that we have had a much longer experience of gas manufacture than any other country in the world. Why then have we—knowing more than anybody else—adopted so widely the continuous vertical retort? Perhaps the designers of the continuous vertical retort are too modest. Mr. Finlayson and his colleague wanted to be impartial. The horizontal retort has a high degree of flexibility—you can leave it empty when you like. It will treat, and the coke oven will treat, a wide variety of coals, always provided they will form a coke strong enough to be pushed. But what other retort or chamber can be individually varied in output, from, say, 10% above its rating to 50% below? The survival of the horizontal retort in the very small works is easy to understand but its survival in the large works is more puzzling.

The position of the intermittent vertical is interesting. It is not, we think, a particularly elegant method of carbonization, except when it is enclosed. Here some of the advantages of continuous carbonization can be recovered together with the production of a coke of somewhat higher density than can be produced in the continuous retort. It is a pity that progress in the devlopment of these systems was interrupted by the war and that it is likely to be resumed only with difficulty in the present shortage of materials and especially in the present high pressure of demand for the standard types of plant. Examination of the patent records shows that designers are ready with ideas which might not only reduce the capital cost of the enclosed intermittent, but which might lead to the introduction of an entirely novel form in which the retort would be internally heated (in the sense that it would be built round the combustion chamber), a process which might show some astonishing results.

It is assumed in some quarters that the coke oven will be used as base-load plant in the super gas station of the future. But while the economies in labour and maintenance of a very large plant must be admitted, it must be remembered that it depends on a market for a special type of coke and that from all the points of view of the works of more moderate capacity it possesses no obvious advantages at all. It has, however, the serious disadvantage, which it shares with the other systems in which coke is discharged hot, that it cannot be built within urban areas, where it would constitute a menace to the amenities of life.

The section of fuel economy does not profess to go beyond Dr. S. Pexton's classic of 1943 ; and here we may usefully jump to the consideration of future possibilities, looking back to Dr. Pexton's remarks. Considerable reductions in the fuel account have recently been made in the continuous vertical system, as, for instance, by directing the heating flames from both sides of the setting towards the centre, bringing the zone of primary combustion into more direct contact with all the retorts, utilizing the heat in the outer walls to raise the temperature of the secondary air. Dr. Pexton's suggestion that the residual heat of the coke should be further used to heat primary air to producers will no doubt be tried out when conditions are more favourable. At any rate it is clear that he was justified in the dictum that "this system probably offers the greatest scope for further improvement."

The importance of controlling the coke/gas ratio is well recognized. It can, indeed, be shown that it would be quite practicable to achieve complete gasification by the combination of carbonization with water gas production. This could be done, for instance, by using vertical retorts, heated by coke in producers in the usual way, converting the balance of the coke to water gas and mixing it with the coal gas. Or the whole of the coke could be gasified to water gas and a proportion of this used to heat the vertical retorts. By the first method, steaming Yorkshire coals to 450, a final output of 175 therms at 365 would be obtained and by the second 160 therms at 370. Such calorific values are outside present practice, but they are not impracticable, and they could be raised by the juidicious use of oil as long as this is available at a reasonable price. From the point of view of coal economy in useful therms available to the consumer there may be something in it. Coal economy is likely to be the final yardstick when the proposed central control gets down to the consideration of the place of gas in a national fuel policy. It should be already clear that a general reduction of supplied calorific value would effect an immediate saving in coal—and this without any appreciable inconvenience to anyone. We may be a two-fuel industry, but it cannot be denied that for some time to come it will be most important to make as much gas as possible with the coal available.

It is interesting to note that already in the nationalized industry of France one of the first duties undertaken was to make a survey of the plants available, the needs in material and labour to bring them into good condition, and the capacity of constructors to carry out the necessary work. This survey was paralleled by similar ones of the allied fuel industries and submitted to the central planning

authority. In this way it is hoped to ensure that the gas industry in France will secure its fair share of the steel and other materials which are required in the maintenance and extension of industrial plants as a whole.

THE THIRD READING

On another page we publish a drastically condensed report of the debate on the third reading of the Gas Bill, which completed its passage through the House of Commons last Wednesday and has now gone to the Lords. It is five months since the Bill was first published and it goes to the Upper House in only a very slightly altered form from that in which it made its initial appearance. In Committee the Opposition put down 820 amendments while the Government put down 63, as against 417 Opposition amendments and 171 Government amendments to the Electricity Bill. On an average the Committee spent 55 minutes on every amendment made, compared with 18 minutes on the Electricity Bill, and 23 minutes on every amendment discussed as compared with an average of nine minutes on the Electricity Bill. The total hours spent in Committee were 127 on gas and 60 on electricity, and there were 156 divisions on the Gas Bill against 35 on the Electricity Bill. It might be assumed from such a record that many changes were made in the Bill, but that is not so. There have been changes in the compensation clauses, extending war damage compensation to holding companies and increasing the global sum for severance compensation to local authorities from £2,000,000 to £2,500,000. Concessions have been made on co-partnership, to the extent that existing schemes may continue for a time without their funds being distributed and that it is open to both sides of the industry to make new arrangements in substitution for old co-partnership schemes. And there have been some re-arrangements of the geographical boundaries of the Area Boards, of which we published details in the "JOURNAL" of June 9 (p. 537). But the broad outline of the Bill remains unaltered, and Mr. Brendan Bracken still holds that it is one of the worst Bills ever brought in by this Government. At times the third reading debate became heated, and towards the end of his closing speech Mr. Gaitskell had to shout to make himself heard above the clamour of the Opposition. The final figures were 340 for the Bill and 190 against, giving a Government majority of 150.

CENTENARY DINNER

The Centenary Dinner of the Tottenham and District Gas Company, which was held at Grosvenor House, London, on Tuesday of last week, was an occasion worthy of a hundred years' service by a Company famed not only for its efficiency and enterprise but also for the "family spirit" which pervades the organization and was much in evidence on June 15—the culmination of a series of events attended by the employees of the Company, several of whom have served for more than half its life. The present Chairman's grandfather, Sir Corbet Woodall, was Governor of the Gas Light and Coke Company while at the same time being Chairman of the Tottenham Company. The father of the present Chairman, Mr. Henry Woodall (unfortunately unable to attend the function) was Deputy Governor of the G.L.C.C. and at the same time Chairman of the Tottenham Company. These facts—which constitute a proud record—were referred to by Colonel H. C. Smith (Deputy Chairman and Managing Director, and Deputy Chairman designate of the Gas Council) at the Centenary Dinner, which, presided over by Mr. E. C. Woodall, was a distinguished and a thoroughly happy gathering. A report of the speeches is published on later pages of our issue to-day.

NATIONALIZATION DANGERS

On Thursday of Institution Week Colonel W. M. Carr addressed managers of the United Kingdom Gas Corporation's undertakings. His speech, at a luncheon at Grosvenor House, London, was characteristically forceful. It was reported in our issue last week. Not without foundation, Colonel Carr, in common with many of us, views with alarm the huge losses of the National Coal Board during the past 12 months. Who is to pay for the enormous deficit? The answer, of course, is that each one of us will have to share in the burden. The cost of fuel is a basic cost; if our export prices, including as a significant element the price of fuel, are not competitive, our overseas sales will languish and our standard of living will fall further. Remarking that in any business it was dangerous to introduce inexperienced administrators in permanent positions at the highest level, Colonel Carr expressed the hope that in the new structure of the gas industry the authorities would not establish an organization with no set function, like a builder starting to build a house by constructing the roof first. Under the new arrangements for the gas industry there should be no appointments of people to control the industry who had not proved their efficiency and who had not had experience in the conduct of that industry. If the chairmen of the 12 Area Boards were all men well experienced in the industry, there would be little need to fear greatly that the structure would not be good. Above all, he hoped there would be, not dictation, but full delegation of responsibility throughout the industry. With full justification, he instanced the policy of the United Kingdom Gas Corporation in this regard. The success of this organization, in the teeth of frustration during the war years and after, provides a shining example of wise central control and guidance coupled with the insistence that the "man on the spot"—*i.e.*, the manager of the individual undertaking—should exercise to the full responsibility and ingenuity, with enthusiasm undimmed and efforts unimpeded by red tape.

BETTER STREET LIGHTING

Street lighting has passed through many phases since 1939. First there was the total black-out; then came "star" lighting, followed by "moon" lighting, turned on and off from time to time according to the nature and intensity of aerial warfare. In the days immediately after the end of the war lighting authorities were given every encouragement to resume full lighting, but before they could get their lamps trimmed and in good working order fuel restrictions compelled them to extinguish many of their lights, and the fuel crisis early last year brought about an almost complete black-out. The crisis past, considerations of public safety triumphed over fuel conservation but only to the extent that not more than 50% of the amount of fuel used before the war was to be consumed for public lighting. Priority was given to main roads, which meant that residential roads were—and still are, at the moment—kept in a depressing state of twilight. It is therefore with a sense of satisfaction that we record a question and answer in the House of Commons last week. Mr. H. E. Randall (Clitheroe, Lab.) asked the Minister of Transport whether he would consider relaxing the present restrictions on street lighting. Mr. A. Barnes: "Yes, Sir. Whereas lighting authorities now generally work to a figure of 50% of pre-war consumption of fuel for street lighting, I am prepared to agree an increase to 75%, in view of the need, on safety grounds, for a better standard of street lighting. Lighting authorities are being so informed."

REDUCED PURCHASE TAX

The reduction by one-third of purchase tax on gas water heaters and space heaters, announced last week, is the answer of the Chancellor of the Exchequer to the campaign of the British Gas Council for the removal of purchase tax on all gas appliances. The Government's decision, which is satisfactory as far as it goes, recognizes that it is fallacious to suppose that economy in the use of fuel can fairly be secured by the taxation of appliances. The use of apparatus designed to provide a particular and essential fuel service in the most efficient and economical manner should be encouraged. A year ago the Government responded to the representations of the Council and abandoned its intention to impose purchase tax on gas cookers and certain other appliances. The Council will continue to urge that such exemption should be extended to gas appliances still remaining subject to purchase tax, which Mr. J. R. W. Alexander has described as a blunt fiscal instrument. It disregards the needs and income of the consumer and the ability of gas undertakings to meet reasonable gas demands which have not generally expanded beyond the resources of the industry, owing to its control of the distribution and installation of appliances, the flexibility of gas-making plant, and storage capacity.

According to a Statement by Mr. M. F. Titterington, M.P. for South Bradford, there appears to be no prospect of reviving the Provisional Order under which it was hoped to vary the Bradford Corporation Gas and Improvement Act of 1871 to permit the deficit of £19,593 on the Bradford Centenary celebrations to be met from reserves of the gas undertaking. Mr. Titterington said the matter had been discussed before the Committee of Unopposed Bills, and the Provisional Order was not confirmed; the Committee's decision appeared to be final. Letters have been addressed to Mr. Attlee, Mr. Morrison, and Mr. Aneurin Bevan on behalf of the Bradford Corporation, but it is unlikely that new means will be found of getting official approval for the transaction before the Gas Bill becomes law and prevents it altogether. It would appear that the only alternative is to meet the deficit from the city's rates.

Personal

Mr. L. J. CLARK (Gas Light and Coke Company) was elected President of the London and Southern Junior Gas Association at the annual meeting last Friday. Mr. A. H. SAVILL (Wandsworth) was elected Senior Vice-President, with Mr. T. V. GARRUD (Gas Light and Coke Company) as Junior Vice-President.

* * *

For some years Mr. S. H. COLLINS and Mr. O. W. WELLS have been Joint Accountants of the Gas Light and Coke Company. Mr. Collins will retire from the Company's service on June 30 and the Directors have arranged to retain his services as Financial Consultant. Following Mr. Collins's retirement, Mr. Wells becomes Chief Accountant.

* * *

Mr. STANLEY HOPKINSON, Public Relations Officer of the Liverpool Gas Company, has been appointed first Chairman of the newly-formed Liverpool and District Publicity Association. At a meeting of founder members, held at the Gas Company's offices and addressed by Mr. Hopkinson, it was agreed to hold the first annual meeting in July and the first luncheon meeting in September.

* * *

Mr. A. IFAN JONES, Managing Director and Secretary of the Holyhead and North Wales Gas and Water Corporation, has, at his own request, relinquished the duties of Secretary, which he has carried out for a period of 23 years, and the Directors have appointed Mr. W. O. HUGHES, who was previously Assistant Secretary, to the position. Mr. Jones continues in office as Managing Director.

* * *

Mr. GEORGE COBB, of the Johnstone Gas Department, has been appointed Assistant Engineer and Manager of the Buckhaven and Leven Gas Commissioners. His removal has necessitated his resignation from the post of Hon. Secretary and Treasurer of the Scottish Junior Gas Association (Western District). His successor is Mr John Alcorn, Chief Technical Assistant to the Paisley Gas Department.

* * *

Mr. JOHN FORBES CAMERON, M.A., Chairman of the Cambridge University and Town Gas Light Company, was among the distinguished recipients of honorary degrees which were conferred by the new Chancellor of the University, Field Marshal Smuts, on June 10. Mr. Cameron, who received the Degree of Doctor of Laws, has been Master of Gonville and Caius College for 20 years, and is a former Vice-Chancellor of the University; in addition he is the Chairman of the Cambridge University Press Syndicate. He became Chairman of the Gas Company in 1928.

Diary

June 29.—**Southern Association of Gas Engineers and Managers**: Summer Meeting. All-day visit to the coke oven plant at the Beckton Works of the Gas Light and Coke Company.

July 2.—**Waverley Association of Gas Managers**: Annual Meeting, Y.M.C.A. Hall, Edinburgh.

July 6.—**National Federation of Gas Coke Associations**: National Technical Committee, Gas Industry House, 2 p.m.

July 6.—**Solid Smokeless Fuels Federation**: Technical Committee, Gas Industry House, 3.30 p.m.

July 14.—**Technical Sub-Committee (Domestic Development Committee)**: 10.30 a.m., Gas Industry House.

July 14.—**Domestic Development Committee**: 2 p.m., Gas Industry House.

July 15.—**Solid Smokeless Fuels Federation**: Executive Committee, Dorchester Hotel, Park Lane, 11.30 a.m.

Letters to the Editor

Oil versus Coal

DEAR SIR,—The issue of the "GAS JOURNAL" of June 9 contains an interesting editorial entitled "Oil," which has reference to some remarks made by Mr. J. A. Oriel at the April meeting of the North-West Fuel Luncheon Club. In the course of these it is suggested that our present coal-burning steam railway locomotives could advantageously be replaced by Diesel-electric units employing imported oil as fuel. It is claimed, indeed, that the ratio of oil equivalence of the Diesel with the coal-fired engines is as high as 7: 1. This may be so, but there are other factors which must be considered if a balanced picture is to be presented. The Diesel-electric locomotive, for instance, costs up to twice as much as a steam engine of equivalent power, and unlike the latter it is not equally efficient over a wide range of loading. Also the maintenance of Diesel-electrics is undoubtedly much higher, so that in the U.S.A. it is customary to take two or more mechanics along with the driver to attend to the engines *en route*.

In the aggregate, therefore, it is not unlikely that Diesel-electric traction would be found unsuitable for general railway operation in this country despite the coal-oil equivalence figures quoted by Mr. Oriel.

The idea of selling abroad our home-produced coal to pay for imported oil may be an economically sound suggestion, but to me, I must confess, it has a Gilbertian ring.

Yours faithfully,

B. RICHARDSON.

Redheugh Gas-Works,
Gateshead-on-Tyne.
June 15, 1948.

Institution Intensive Course

DEAR SIR,—The Institution of Gas Engineers' day intensive course in Gas Engineering (Manufacture) and (Supply) has for some time past been conducted at the Westminster Technical College. I have been greatly helped by the ready co-operation of the Gas Light and Coke Company, South Metropolitan Gas Company, and Wandsworth and District Gas Company in supplying expert lecturers and arranging visits.

Many firms and organizations connected with the industry have also provided samples, literature, and drawings, and have, in some cases, offered to loan films and slides and to give specialist lectures and demonstrations. May I through your columns express sincere appreciation of the kindness and assistance of all those who have helped to make the course a success.

Yours faithfully,

J. N. LONG,
Principal.

Westminster Technical College,
Vincent Square, S.W.1.
June 9, 1948.

News in Brief

Manchester University is holding a Summer School on Measurement in Relation to Heat, at the College of Technology, Manchester, from Sept. 6 to 17. Details can be obtained from the Director of Extra-Mural Studies, The University, Manchester, 13.

The Ministry of Labour and National Service has published a volume of 411 pages reproducing the Regulations and Orders made under the Factories Act, 1947, and certain other Acts. Certain Statutory Rules and Orders made under the Defence Regulations are contained in the appendix to this publication, entitled "Factory Orders, 1948 Edition," which is obtainable from the Stationery Office, price 6s. 6d.

Revenues of the Gas Utility Industry in America were 355.6 mill. dollars in the three months ended Dec. 31, 1947, corresponding to an increase of 11.6% when compared with revenues of 3.817 mill. dollars in the corresponding quarter of 1946. The largest percentage increase was 19.1% in commercial gas revenues. Industrial gas revenues went up 13.6%. The largest actual gain was in residential revenues. Figures reflect sales for ultimate consumption; revenue from gas sales for resale are not included.

The Royal Society opened a Commonwealth conference on the distribution of scientific information, at the Royal Institution, Albemarle Street, London, on June 21. Production and distribution of papers reporting original work were discussed, as also library services, reviews, and annual reports. Thirty-four papers were presented and working parties were set up to examine in detail the various subjects. Sir Robert Robinson, President of the Royal Society, opened the proceedings, and a small exhibition was arranged.

Owing to the Steel Shortage, an application by the March Gas and Coke Company for permission to install two high pressure cylinders to improve gas pressure in outlying areas has been turned down by the Minister of Fuel and Power. The scheme was designed to obviate complaints of poor gas pressure, but additions and improvements have been made at the gas-works and it is hoped there will be no more complaints. The Company is considering further improvements, but these plans may be affected by nationalization.

Sponsored by Mr. R. G. A. Clark, Engineer and Manager, the fitters of the Dover Gas Company heard interesting and instructive talks recently by Mr. Arthur Forshaw, M.Sc., Chief Chemist, of R. & A. Main, Ltd., and Mr. E. Andrew, of the Technical Department of Main Water Heaters, Ltd. Mr. Forshaw elaborated his theme, "Improving the Breed," and by the aid of lantern slides showed how the appearance and performance of gas cookers have developed in the past century. Mr. Andrew dealt with the latest designs in instantaneous and storage water heaters now being produced by the firm.

The Motherwell and Wishaw Gas Department's offices are to be extended at an estimated cost of £6,500. The extensions, in addition to offices, will include laboratories and testing rooms.

To Assist in Avoiding Clashing with dates of meetings of other organizations, preliminary notice has been given of the annual general meeting of the Southern Association of Gas Engineers and Managers, to be held at the Connaught Rooms, Kingsway, on Oct. 26, at 2.30 p.m., preceded by a Council meeting at 11 a.m.

A **Special Advertising Campaign** in the columns of *The Times* is an interesting part of the British Gas Council's current advertising. The campaign stresses the importance of the gas industry to the nation's economy, each advertisement carrying the slogan "Gas makes the most of Britain's wealth." The first advertisement in the series appeared on June 10, and will be followed by others at monthly intervals. The small spaces obtainable (5½ in. double column) are ingeniously used to illustrate not only the domestic and industrial uses of gas, but also its services to the community as a great chemical industry. The British Gas Council's 1948-49 advertising also includes campaigns in popular and women's magazines, in trade, technical, and professional journals, and in magazines with a juvenile readership.

Mr. G. E. Currier, Engineer and Manager of the Bradford Gas Department, who is now in charge of the city street lighting, is supervising the preparation of a report on the best way to use locally the 25% increase in the use of fuel for street lighting. Mr. Currier has indicated that he might recommend additional lighting in the suburbs.

The University of Illinois has been holding its second short course on hot water and steam heating systems from June 15–17. The course was sponsored by the University's College of Engineering, and the heating industry's Institute of Boiler and Radiator Manufacturers. The course was designed primarily for workers engaged in installing hot water and steam heating systems.

A Plan under which 150 members of the Paint Manufacturers and Allied Trades Association are to manufacture high quality paints for the export market, using common formulae, standard colours, and packing, and selling through a new co-operative marketing organization, was described in the "JOURNAL" of June 2 (p. 478). The contributor of the announcement now writes: "I very much regret that the name of the marketing company was given as Associated British Paints. The correct name of the company, to which the President of the Board of Trade sent a special message wishing it every success, is Associated Paint Manufacturers, Ltd."

A METHOD OF REMOVING DUST FROM GAS MAINS

By A. G. HOLTAM,

Distribution Engineer and Manager, Cheltenham and District Gas Company

IN the area under the supervision of the writer, which includes several smaller undertakings absorbed during expansion of the boundaries of the Cheltenham and District Gas Company, a number of mains—chiefly small ones—were known to be old and dirty but otherwise in good condition. Due to shortage of labour little progress had been made in cleaning them by our method, which consisted of scraping out with scrapers on drain rods. Also, in this way, only comparatively short lengths could be dealt with at a time, resulting in high excavation and reinstatement costs.

A method developed by the General Descaling Company, Ltd., Sheffield, originally for water pipes and drains, came to my notice, and after some hesitation has been given a fairly extensive trial. The results have been so satisfactory that it is thought an explanation of the method may be of interest to other undertakings.

The equipment, most of which has been registered at the Patent Office, consists of a motorized thrusting and rotating machine (Fig. 1), flexible steel rods extensible in a similar manner to drain rods but fitted with special couplings, scraper heads of various types, and a small motor water pump.

In the case of a main without junctions, a section of about 160 to 200 yards can be dealt with at one operation. At this distance apart two excavations are made, about 4 ft. cut out of the pipe at each point, and the two "live" ends temporarily plugged off as in the diagram. At the lower excavation the rotating machine is arranged opposite and facing the open pipe end, also a pump with its intake in a small sump at the bottom of the excavation. At the higher excavation a 1 in. standpipe is screwed into the main and connected with hose pipe to a convenient house tap or other water supply.

A scraper head is screwed on to the first section of flexible steel rods and the head entered into the open end of the main, the other end of the rods being fixed into the rotating machine. The motor of the latter is started and, via a gear box, rotates the rod and head at from 700 to, if desired, 2,000 r.p.m. At the same time the machine moves gently forward until it reaches the edge of the excavation, when it is put out of gear, the rods disconnected from the machine, the machine moved back, and another rod extension fitted. This process is repeated until the head appears at the higher excavation. The head and rods are then spun backwards by the machine and withdrawn from the main.

When the machine is first started, water is turned on to the standpipe at the rate of about 6-10 gall. per minute—the more the better—and flows down the main, carrying with it the dust and other matter removed from the main, into the sump at the lower excavation, and is pumped away. From the time the machine is started to the time the head is withdrawn again from the 160 yards of main is about 45 minutes, the average rate of boring, of course, being slower (about 40 yards per hour) due to re-arrangement of equipment. The piece cut out of the main at the lower excavation is then reinstated, the cleaned section purged, including any services, and the higher excavation used as the starting point for the next section.

The wings on the scraper head are hinged at the leading end, and as the head revolves are flung out by centrifugal force, thus scraping the inner wall of the pipe. A device is fitted to limit its opening to a fraction of an inch less than the actual pipe diameter. An alternative head has chain links, to the outer ends of which are fitted steel scraping pieces. These also rely upon centrifugal force to open them out. Other alternative heads are available, all relying upon the same principle.

It will be appreciated that while revolving at a high rate, a most effective scraping of the pipe is obtained but that no hammering of the pipe takes place. The scraping is thorough and effective, but places no undue strain upon the pipe. The most likely cause of damage to the pipe would be from the whip of the flexible rods and connectors, but none has matured within the writer's experience.

During the operation the consumers in the section are without gas, and if the main is fed from one end only, then all the consumers beyond the section. All have to be warned beforehand. In the case of, say, a 6 in. main, the time required is about three hours, the most convenient time of day usually being the afternoon following morning preparations.

In one case a 3 in. main was found to be waterlogged after cleaning, but was effectively cleared by compressed air from a portable compressor.

The costs vary with circumstances, and with the mains so far cleaned amounted to 2,640 yards of 3 in., 4s. 4d. per yard; 2,297 yards of 5 in. and 6 in., 4s. 1d. per yard, exclusive of permanent reinstatement of footpath and carriageway surfaces. The 3 in. mains were four shorter sections with several branches. The 5 in. and 6 in. were two straight sections with a reduced number of branches. Except for the cost of collars and short pieces of pipe to replace, the diameter makes but little difference to the overall cost.

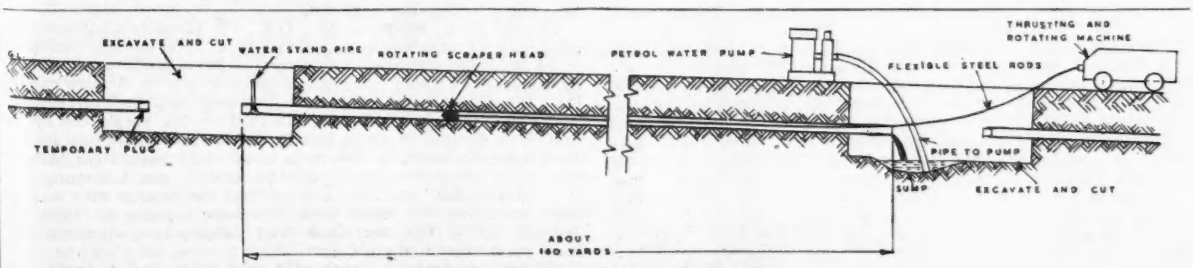
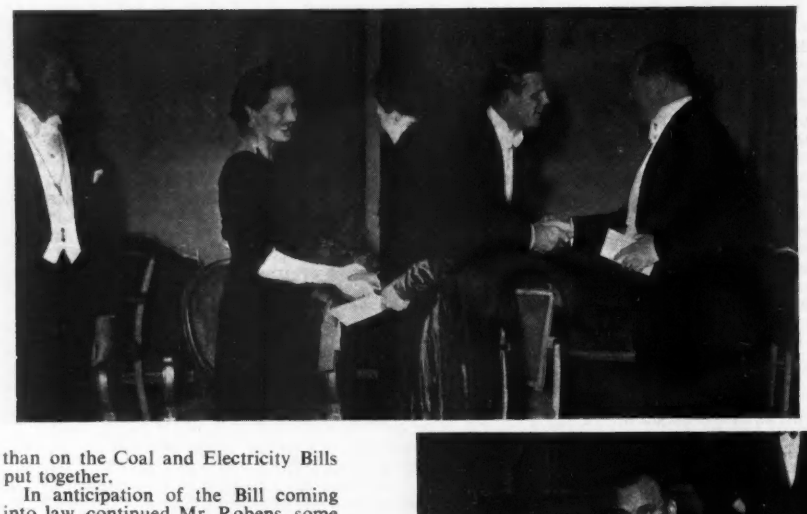


Fig. 1.—Diagram of main cleaning.

A CENTENARY CELEBRATION

A DINNER in celebration of the Centenary of the Tottenham and District Gas Company was held at Grosvenor House, London, on Tuesday, June 15. The Chairman, Mr. E. C. Woodall, O.B.E., M.A., presided, and the function, attended by many distinguished guests, was in the happiest vein.

Mr. **Alfred Robens,** Parliamentary Secretary, Ministry of Fuel and Power, proposing "The Tottenham and District Gas Company," said that the centenary year coincided with the Bill for the public ownership of the gas industry. The toast could not, therefore, be to the future success of the Tottenham and District Gas Company, because in name it would cease to exist. The toast, however, could be the spirit, service, and enterprise of the Company, because he hoped that under public ownership that would go on. What gave him great pleasure to record was not so much the size of the Company, but its efficiency. Indeed, the way in which the Company had been built up through the years was really a forerunner of the type of integration which had been planned in the Gas Bill. Speaking of the Bill, it would perhaps be as well to say what an amazing experience it had been to one like himself, a comparatively new junior Minister. With the background of the Heyworth Report and the political changes of 1945, it would seem that the Bill would be the most innocuous measure of all the public ownership Bills that had been passed to date. Yet, more Parliamentary time had been spent on the Gas Bill than on the Coal and Electricity Bills put together.



In anticipation of the Bill coming into law, continued Mr. Robens, some appointments had been made. While it was a great compliment to the individual, he believed it was also a great compliment to the Company that the Deputy Chairman and Director, Colonel H. C. Smith, had been appointed Deputy Chairman designate of the new Gas Council. Colonel Smith had played a leading part in the national affairs of the gas industry and his work on the Gas Employers' Federation and on the National Joint Industrial Council would be best remembered, he thought, by the fact that the Gas Industry had a very low record indeed of industrial disputes. It had been a happy industry. He was sure that one of the great contributions to the economic recovery of this country would be the sensible way in which they used raw coal. Here there lay before them, through carbonization, a vast field of new wealth. The basis of new industries and the enlargement of others would be due very largely to the years of toil and unremitting effort that have been put into the work by those who had built up the industry. Whatever their views might be individually on public ownership, he was certain that the men who worked within the industry would recognize the change that was taking place and they would give to the new organization that sterling service they had always rendered. "I ask you to raise your glasses to the spirit of enterprise that the Tottenham and District Gas Company epitomizes, to its successful centenary which has weathered the storms of the years of the great changes that have taken place in the lives of the people in this last 100 years."

Mr. **Woodall,** replying to the toast, first read a letter from the former Chairman, his father, Mr. Henry Woodall, regretting his inability to be present and wishing the guests and all his old friends a happy evening. He went on to say that listening to Mr. Robens' speech he was nearly convinced that a short Bill would be rushed through Parliament exempting the Tottenham Company from the general fate of the industry. "I would like to say a few words about companies in general," Mr. Woodall proceeded. "I think there is a tendency to use words much too loosely. For instance, 'the State' is far too often used as meaning those few people who, for a short or sometimes far too long a time, hold the reins of Government, instead of the whole body of citizens, rich and poor, saints and sinners, who do in fact compose it. I suppose, strictly, 'company' means a body of shareholders, but to us it means far more than that; it means the shareholders and all those who work for the Company. We have in the Tottenham Company a fine record of service. Many families have served the Company, and I can think of one which has put in 140 years' service already. I might add with modest pride that my own family has given 84 years to this Company. I am sure that anybody who was with us on our centenary outings to Margate would have realized what a happy family we are. I am quite sure that the spirit which has animated the Company for 100 years will continue to do so whatever the future may bring.

"In the appointments the Minister of Fuel and Power has made to the Gas Council, it is good to know that they have chosen people who really do know the gas industry from the inside; and I would like to congratulate them thereon. Mr. Robens had said many pleasant things about Colonel Smith, but he omitted the most important one—that he was a prime opposer of the Bill. I cannot conclude without quoting to you the rather hackneyed lines which have been running through my head all day. 'Men are we and must grieve when even the shade of that which once was great has passed away.' Wordsworth was writing of the once great and free Republic of Venice then in its unworthy decadence. We are thinking to-night of a great industry which, though full of years, is still full of youthful vigour and enterprise.

I am sure that all who have served in the industry will continue to serve the community and the new set-up in the spirit which the gas industry has always shown."

Colonel **H. C. Smith,** C.B.E., D.L., J.P. (Deputy Chairman and Managing Director) proposed the toast of "The Guests." In doing so he remarked that the evening marked the culmination of a series of celebrations which had been designed to enable them to express their thanks to many friends for the help they had given them. The previous events had been attended by the employees of the Company, several of whom had served for more than half its life. They were fortunate in having a loyal and co-operative team of employees to whom much of the success the Company had enjoyed was due, and they realized that the happier men were in their home life the better work they were capable of doing. In appreciation of this they had been delighted to entertain with them their wives and children.

Continuing, Colonel Smith said they were glad to have with them Mr. Tom Williamson and Mr. Fred Hayday as representing

many of the workers, and to express to them the satisfaction they felt at the many years of co-operative effort. Dr. Harold Hartley was a guest whom any body of gas men would be delighted to honour. They in the gas industry were indebted to him for his conduct of the affairs of the Institution during what seemed likely to be the last year of the gas industry under private ownership.

Mr. Robens, Sir Donald Fergusson, Sir Guy Nott Bower, and Mr. Kelf-Cohen represented the Ministry of Fuel and Power, the Ministry which had been responsible for placing the industry under new guardianship. He thought it would be generally agreed that its old parents had not looked after it so badly for the past 100 years or so, and indeed it had increased in stature and usefulness in a most remarkable manner during that period. As, however, the time had come when those in authority had decided that changes must be made, they could only be thankful that they had been given an opportunity of having some say in the consideration of the principles which would govern the conduct of its new life. "There has," said Colonel Smith, "always been a friendly association between the Tottenham Company and its great neighbour the Gas Light and Coke Company. Our Chairman's grandfather, Sir Corbet Woodall, was Governor of the G.L.C.C. while at the same time being Chairman of this Company. His father, Mr. Henry Woodall, whose many kindnesses and encouragement I shall always remember with gratitude, and whose absence tonight we all regret, was Deputy Governor of the G.L.C.C. and at the same time Chairman of the Tottenham Company. Two late Chief Engineers of the Gas Light—Mr. Thomas Goulden and Mr. Thomas Hardie—were also Directors of the Tottenham Company. Such a connexion does not exist now, but friendly relations so firmly established do not fade on that account and we extend a warm welcome to Mr. Michael Milne-Watson, who is so ably following his father, Sir David Milne-Watson, as Governor of the Gas Light and Coke Company."

Colonel Smith also welcomed Mr. Frank Jones, Dr. E. V. Evans, Sir Ernest Hiley, Mr. F. B. Richards, Col. W. R. Glover, Mr. D. M. Henshaw, Lord Hyndley, and Mr. W. N. C. Clinch. He coupled the toast with the names of Lord Falmouth and Mr. A. E. Sylvester. Lord Falmouth was an old friend of the gas industry, which owed him its gratitude for the many occasions on which he had shown his practical interest in its affairs. He was particularly interested in research and scientific development, and as President of the Gas Research Board had fully played his part, together with the Chairman of the Board, Dr. H. Hollings, and the Director, Dr. J. G. King, in advancing the work of the Board and the industry. Unfortunately the Gas Research Board had not had time to get into its stride properly before war was declared, and they owed much to Lord Falmouth's encouragement and backing in re-orienting the programme of the Board to post-war conditions. Mr. Sylvester needed no introduction. While he often referred to himself as a "new boy" in the gas industry, he had established himself on a sufficiently firm foundation not only to be elected to the new term's first team, but in addition to lead it as Captain. "I ask you to raise your glasses to the spirit of enterprise that the Tottenham and District Gas Company epitomizes, to its successful centenary which has weathered the storms of the years of the great changes that have taken place in the lives of the people in this last 100 years."

Viscount **Falmouth,** replying, said that not many industrial undertakings could look back upon 100 years of useful service to the community. No great undertaking was greater than the people who composed it. In the Tottenham and District Gas Company they had an old-established undertaking and one which would maintain its prime of manhood for many years to come. They had built up a great tradition; and tradition counted for a great deal in industrial life. They were told they were to be sacrificed on the altar of social industrial responsibility. He did not know what that was unless they themselves were a wonderful example of it. They had done a wonderful thing; now the executioner was at hand. It was true gas would still be delivered in the future, but he did not know whether there would be quite the song in the heart that went with the treatment of gas to-day.

Mr. **A. E. Sylvester,** Chairman-Designate of the Gas Council, also replied.

Seaside and River Trips

As part of the Centenary celebrations, the Tottenham and District Gas Company recently concluded a series of special seaside and Thames river outings at which employees and their families and pensioners and their wives, numbering about 5,500, were the guests of the Chairman and Directors. In all there were 10 trips. For the first the Company chartered the *Royal Eagle* steamer to take 1,100 to Southend and Margate, all meals being served on board.

Then came seven outings to Margate by train, starting in the Hertford district of the Company's area, calling at certain local North London stations *en route* and crossing London to run non-stop to the Kentish resort. Catering was done on a big scale at Margate's best known holiday centre, as many as 800 being accommodated at a sitting. For the other outings the Company conveyed their guests from the chief office at Wood Green to Windsor by coach and thence by launch up the river to Marlow.

The Chairman and Managing Director (Mr. E. C. Woodall), was with the large party on the *Royal Eagle* and was accompanied by Mr. C. S. Pryor, a Director. Mr. Woodall also went to Margate on one of the train trips, and was greeted at dinner by the Mayor (Alderman W. J. Perkins, J.P.) and Mr. William Booth Reeve, M.B.E., J.P., 86-years-old Chairman of the Isle of Thanet Gas Light and Coke Company, and other officials of the local Company, including Mr. T. H. Prater, Engineer, formerly of the Tottenham Company's staff. Colonel H. C. Smith, C.B.E., D.L., Deputy Chairman and Managing Director, and Mrs. Smith joined the last of the train trips and accompanied one of the smaller parties up the river to Marlow.

In a message to the Company's magazine Mr. Woodall says: "To me the keynote of our outings was that we were a united family determined to enjoy ourselves; I know I did and I have seldom seen so many happy faces of all ages. It was good to welcome the rising generation and particularly the old friends who joined us once again for the day. This may well be the last time that we shall be able to celebrate together. I hope that the happy days we spent and the many excellent photographs which were taken will enable all of us, in the years to come, to keep green the memory of Tottenham and District Gas Company."

The outings were organized by Mr. R. H. Epps (Secretary and Accountant), Mr. A. E. Songest (Liaison Officer), and Mr. R. W. Woodley (Personnel Officer), who have been congratulated on the success of their work.

INTERNATIONAL COMMISSION ON ILLUMINATION

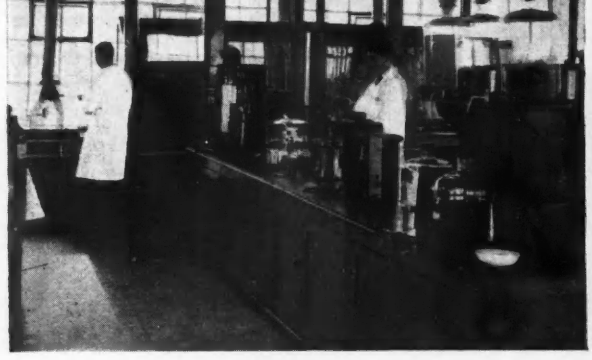
The 11th meeting of the International Commission on Illumination will be held in Paris from June 29 to July 7. The proceedings cover a large number of subjects related to illumination, both artificial and natural, many of which are of interest to the gas industry, and the following members of the Joint Lighting Committee of the Institution of Gas Engineers and the Society of British Gas Industries will be attending:

Messrs. P. Crawford Sugg, B.Sc.(Eng.) (W. Sugg & Co., Ltd., London); F. W. Sansom, M.B.E. (Exeter Gas Light and Coke Company); J. B. Carne, B.Sc. (South Metropolitan Gas Company); S. F. Baker (Horstmann Gear Co., Ltd.); and A. G. Higgins, M.Sc. (Assistant Secretary, Institution of Gas Engineers).

CENTRAL LABORATORY AT SHEFFIELD

THE new laboratory of the Sheffield and District Gas Company, pictured here, replaced that which was demolished by enemy action in December, 1940. The whole of the chemical control of the undertaking is centralized in this laboratory; no mean task, when one considers that the area of gas supply is over 500 square miles and that gas is manufactured at five stations and 12 coking plants. The daily quantities are in the region of 15 mill. cu.ft. manufactured gas, comprising continuous vertical retorts, horizontal retorts, carburetted water gas and producer gas, and approximately 35 mill. cu.ft. per day of crude coke oven gas, which is received into Sheffield for purification before mixing with the manufactured gas.

The laboratory was carefully planned to produce the maximum working efficiency and is housed in a well-lighted modern building equipped with all services. The ground floor is reserved for the handling of bulk samples and is equipped with an electrically driven coal grinding machine, screening units, and shatter test apparatus.



View of the laboratory with the muffle furnace and fume cupboards in the background.

Good lighting and ample floor space are features of the laboratory. The working bench has a plentiful supply of drawers and cupboards which are well clear of the tiled floor.

Here also is housed the plant providing the vacuum service for the analytical laboratory, which occupies nearly all of the first floor. The apparatus and working benches are so arranged as to prevent unnecessary fatigue to the chemists, particular attention having been paid to bench heights, free floor space, and location of materials.

Supplies of coke oven gas are, by agreement, restricted in regard to the permissible content of certain constituents, and the following is the standard specification adopted:

(*a*) The gas shall not contain:—(1) Any tar as ascertained by the usual tests applied in ordinary gas-works practice; (2) more than 2 gr. of ammonia per 100 cu.ft.; (3) more than 0.5% of oxygen; (4) more than 40/P gr. of naphthalene per 100 cu.ft. of gas corrected to an atmospheric pressure of 30 in. mercury and a temperature of 60° F., where P is the absolute pressure in lb. sq. in. of the gas at the point of delivery; (5) more than 1,000 gr. of sulphuretted hydrogen per 100 cu.ft.; (6) more than 9% of nitrogen.

(*b*) The calorific value of the gas must be maintained at not less than 515 B.Th.U. averaged over 24 hours with a tolerance of 5% above or below, but the quality must not be 5% plus or minus for more than two consecutive hours in any one day.

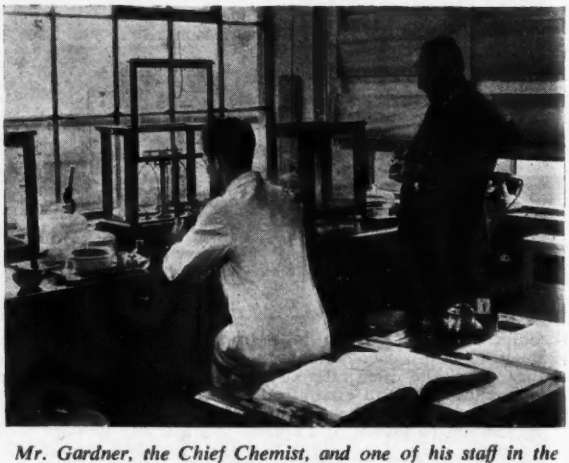
As the coke oven gas is collected into a trunk main bringing all supplies to Sheffield, it is essential that each supply should be checked at the source of manufacture. Accordingly, two chemists, dividing the ovens between them, each travel 55 miles daily by car in order to carry out routine tests and collect samples at each coke oven. Independent pressure and temperature recorders are fitted at the Connersville meters in order to provide a check on the corrected gas volumes, while the Fairweather calorimeter installed at each oven has an adaptation in order to relay automatically calorific value readings along with meter readings to the central control room in Sheffield. All these instruments are checked by the visiting chemist.

The larger manufacturing stations of the Company are provided with full-time chemists and the smaller stations have a visiting chemist. Combustion chamber temperatures on the vertical and horizontal retort settings are checked daily by Cambridge D.F. pyrometers, while the various streams of gas have regular 24-hour samples taken for complete analyses. Continuous testing for sulphuretted hydrogen is carried out on the outlet of each section of purifiers by an adaptation of the G.L.C. test, the measurement of the depth of stain being made by the Sanger Shepherd density meter and calibrated wedge, the degree of purification being determined as parts H_2S per mill. cu.ft. By this method a careful check is kept on the efficiency of the purification process and a good visual guide is always available.

Each works is supplied with a special type of report book containing separate indexed sections for the various tests. These are entered and the books returned to their respective works each day. In this manner, each works engineer is kept conversant with all tests appertaining to his particular works. In addition, he is informed immediately when any unusual tests are made so that in emergencies remedial steps may be taken without delay.

It will be seen that the central laboratory deals with a large number of samples and tests from the various works and coke ovens in this large area. The naphthalene tests, for example, amount to a total of 24 estimations daily, while spent oxide tests average between four and five each day.

All coal and new oxide deliveries to the works are sampled regularly, and tested, while other general work includes the testing of tars, boiler feed water, paints, oils, refractories, alloys, &c. In addition to the tests in connexion with gas manufacture, considerable work is carried out for other departments of the Company, including analyses of deposits from mains, meters, and appliances, while special investigations are carried out as required.



Mr. Gardner, the Chief Chemist, and one of his staff in the balance room.

The duties of the chemists are varied by interchanging between the central laboratory, the works, and the coke ovens; and while thus adding to the interesting nature of their occupation, they are provided with valuable experience in all aspects of gas manufacture. The central laboratory has proved a good training ground, and a number of the staff have now obtained important positions in the industry.

GAS BILL PASSES ITS THIRD READING

THE Gas Bill passed its third reading in the House of Commons on June 16, and was sent to the House of Lords. The motion for the third reading was carried by 340 votes to 190.

Mr. A. Robens, the Parliamentary Secretary to the Ministry of Fuel and Power, in moving the third reading, said no Bill with which the House had dealt during the present Parliament had received such minute scrutiny. The gas industry's own report in 1943 came down heavily on the need for integration and co-ordination; the Heyworth Report did the same, and the fundamental difference between the Opposition and the Government as to how that should be achieved was decided at the General Election in 1945. It was really a twin of the Electricity Bill; indeed large parts of the Gas Bill, such as the compensation provisions, were lifted bodily from the Electricity Bill and put into the Gas Bill almost word for word.

Because of the advantage of experience which both sides had gained from the Electricity Bill fewer amendments to the Gas Bill were found necessary. Actual amendments since the second reading totalled 250; 138 were made in Committee and 112 on the Report and the Re-Committal stages, compared with a total of 353 for the Electricity Bill. There had been no real criticism of the main feature of the Bill, namely the decentralization of the organization under autonomous area boards, and the industry generally was satisfied with that set-up. The appointments of Mr. Sylvester and Colonel Smith as Chairman and Deputy Chairman-Designate of the Gas Council had been widely welcomed by the industry, and they would make other appointments as quickly as possible. They recognized that it was highly important to settle these appointments quickly. They must relieve the minds of the people in the industry, who were doing technical and administrative work, as to their position; naturally they wanted to know how they would fit in and in what way.

British Gas Council's Help

Reviewing changes that had been made in the Bill, Mr. Robens expressed appreciation of the help of the British Gas Council, particularly in regard to the change in the schemes of areas. Publicly owned industries, he added, must stand on their own feet, and wrapped up in the prosperity of the industry inevitably was the prosperity and well-being of every individual worker in the industry. Great changes could not take place overnight. The Bill embodied the principles of integration and co-ordination which all parties were agreed were necessary. The advantage of the Bill was that it represented a clean cut method of securing those essentials.

Lieut.-Colonel W. Elliott (Scottish Universities, C.), moving that the Bill be given a third reading three months hence, said Mr. Robens had been discreetly silent on the question of a cheaper and more plentiful supply of gas. The area boards and the Gas Council were illusions. The transfer to such boards or to the Minister of the property of gas undertakers and other persons was a sheer series of looting transactions calculated to discourage initiative in private individuals and saving among local authorities. The co-ordination of the activities of the area boards and the National Coal Board was one of the purposes of the Bill which at no period had the Minister fully explained. "We say that this is a thoroughly bad Bill, that it has not been adequately defended by the Minister, that it has not been adequately amended either by the Committee upstairs or by the House on Report, that it will only add to the confusion and muddle in which the fuel affairs of this country are already too deeply embedded and bogged down. For all these reasons I have pleasure in moving the rejection of this Bill."

Mr. R. Ewart (Sunderland, Lab.) said the Bill would give great satisfaction to the workers in the industry and would eradicate many of the anomalies which existed at present. Through the establishment of the Gas Council there would for the first time be machinery to regulate wages on a national basis, which meant the abolition of regional control as they knew it at present.

Colonel R. S. Clarke (East Grinstead, C.) said neither the domestic nor the industrial consumer would benefit from the Bill. And what of the workers? Were they to be adequately compensated for redundancy or for a worsening of their conditions? As between redundancy and a worsening of their conditions, he thought that the worsening of conditions was the more to be feared. Co-partners would most definitely lose. The present owners of the industry, the shareholders, were being disgracefully treated, and £75,000,000 was being taken from the municipalities to form a hidden reserve for the new boards. "I hope," he concluded, "that events in the next year may allow us to throw this Bill into the wastepaper basket."

Functions of Engineers and Managers

Mr. A. M. F. Palmer (Wimbledon, Lab.), supporting the Bill, hoped that the area boards would leave the carrying out of policy to their engineers and managers. The members of the boards should not be jealous of the salaries paid to the officials.

Mr. E. Granville (Eye, L.) said the Liberal Party would support the third reading. He expressed the hope that the Minister would find a method to enable workers actually working in the gas industry to be elected to the various boards, and he still hoped that he would find some incentive, or a continuation of profit-sharing, after consultation had taken place.

Mr. Brendan Bracken (Bournemouth, C.), winding up for the Opposition, said the Bill was rotten to the core. It blighted the prospect of an industry full of promise and vitality, and it not only inflicted grievous injuries on the gas industry but would also damage many other industries, and, in his judgment, weaken Britain's power of recovery. The Opposition deplored their failure to save this great industry from the follies of nationalization. It was the only fuel industry that had not failed the public. The Bill would blot out that distinction, to the great relief of Lord Hyndley and Lord Citrine and some of the oil barons who had played their part in deluding industrialists into abandoning gas and coal in favour of oil, through which millions of pounds had been lost.

He did not believe that the Minister ever intended to give any real power to the Gas Council; the fact was that the Minister still retained decisive powers over the gas industry. There was very little public understanding of the scope of the ramifications of the gas industry and the effects of the Bill on its future. Great developments in the industry would be checked by the bureaucratic bottleneck established by the Bill, which could honestly be described as a Bill for dear gas, a Bill that would add to the cost of living and increase Britain's lamentable tendency to price herself out of export markets.

"To sum up," concluded Mr. Bracken, "this Bill is part of what Mr. Shinwell called a trilogy. It completes the tightest fuel monopoly in the world. It grievously injures our power to export, and hamstrings one of the liveliest and most hopeful industries in Britain. It injures the financial interests of the workers; it skins the investors; it loots the local authorities. It is in fact one of the worst Bills ever brought in by this Government—and that is saying a lot. Let me end by expressing the pious hope that it will be greatly improved in another place."

Mr. Gaitskell, Minister of Fuel and Power, replying to the debate, referred to the salaries of members of the boards of nationalized industries, and said that while it was most desirable that members of these boards should be inspired with the ideals of public service, idealism alone was not enough. "We shall not get the technical men we really need unless we are prepared to pay something not too unfavourable compared with alternative salaries elsewhere. The salaries being paid in the top grades of the electricity industry, for instance, compare favourably with the salaries paid to the members of the boards." There had been a great deal of talk about co-partnership, and the Tory party had made a great deal of the fact that nationalization put an end to co-partnership in one sense of the term. They objected because co-partnership and profit-sharing might be described as the "New Look for the Tories." The fact was that "we have provided for it in the Bill, that if both sides of the industry want to continue with schemes of that kind they can do so. The only thing they cannot do, and we have pointed this out from the start, is to provide that the shares shall be privately owned. There will not be any shares."

Compensation

Turning to compensation, Mr. Gaitskell said he had never been able to understand the fierce opposition to the principle of Stock Exchange values. "There is one very simple argument which I would like to put to the other side," he went on. "Suppose the compensation to be paid to the owners of the shares were grossly in excess of the market value of the shares; would they have defended that position? No, they would not. I equally think that if the stockholders were to get substantially less than the value of their shares that would be wrong." It was a fact that the shareholder in electricity had gained 10% as a result of having his stock taken over.

"This Bill," concluded Mr. Gaitskell, "carries out what is really agreed to by all sensible and sober students of the gas industry. We all agree that integration is necessary and overdue, and that nothing was done about it for years before the war. All that the Opposition can suggest is further delay, a Royal Commission, more lawyers and more accountants, leading to the same position in the end. We do not propose to follow that path or get into that bog; we propose to follow the broad, straight highway signposted in this Bill. The Bill gives the industry the structure it needs. It compensates the shareholders fairly and it provides an opportunity for those in the industry to make the fullest possible use of their knowledge and experience. It is not a sensational Bill but a good solid workmanlike Bill, a sound piece of Socialist legislation with which we are proud to have been associated." Mr. Gaitskell ended his speech in a roar of cheers and interruptions.

As stated, the third reading was approved by 340 votes to 190.

Darlington Corporation has accepted the tender of the Power Gas Corporation, Stockton-on-Tees, for the supply and installation of a carburetted water gas plant at the Corporation Gas-Works.

PARLIAMENTARY NOTES

THE House soon got into its stride following the Whitsun recess. On May 25, the Member for Fife asked the Minister of Fuel and Power if, in view of Sir Charles Reid's resignation and his comments on the National Coal Board, he would set up an independent commission of enquiry to report to Parliament on the work of the Board and the progress of the industry. Mr. Gaitskell replied with a curt "No, Sir," and the same Member asked if no steps were to be taken as a result of the resignation by a man who is the greatest mining engineer, and who had condemned the Coal Board wholesale.

Mr. Gaitskell pointed out that they should not assume that because one member of the Board had resigned, the member was right; there were eight other members on the Board.

The Member for Bristol: "Will the findings of the internal committee set up by the National Coal Board be made public?"

The Member for Hallam: "Does not the Minister agree that it is about time the country was told something about the Coal Board which would relieve the great anxiety felt generally about it?"

Mr. Gaitskell: "The country hears quite a lot about the Coal Board."

The Member for Eccleshall: "Will the Minister agree that it is vitally necessary to have some evidence from a commission of the sort suggested before further experiments are made with the nationalization of other industries, particularly steel?"

Mr. Gaitskell said that he could not agree that the resignation under discussion pointed to the conclusions arrived at by the Members.

The Member for Fife then asked if the Minister was not disturbed by the resignations and by the disappointing output of coal, and whether he was going to pass over these things without doing something.

Mr. Gaitskell: "I am certainly not complacent in any way about the production of coal, but the National Coal Board can claim up to date that they have been moderately successful, considering the circumstances in which they took over the industry. I would certainly not agree that they are indifferent to the possibility of and the need for reforms in their organization. That is why they have set up this committee."

A Member asked the Minister of Fuel and Power if he was not disturbed by the remarks of his predecessor on that matter; Mr. Gaitskell answered No.

The Member for Sutton Coldfield suggested that as the Minister had appointed Sir Charles Reid, the House was entitled to some information about the resignation. The Member for South Ayrshire: "Is the Minister aware that the miners of Scotland do not regard Sir Charles Reid as an industrial know-all superman, and are very glad that he has disappeared?" The Member for Renfrew thereupon asked if the Minister was aware of what miners in Scotland thought about the National Coal Board.

Mr. Gaitskell ended the episode by saying that full statements had been made to the Press both by Sir Charles Reid and the National Coal Board, and that there was no reason for calling for any further report.

Electricity Breakdown

On the following day the Member for Fife rose to point out that he had not been allowed to give the terms of a question concerning the breakdown of the electricity supply on Sunday, May 23. It had been turned down on the familiar grounds that it was a matter for the National Electricity Authority and not for the Minster. The Member went on to say that it was reasonable and understandable that detailed questions affecting the day-to-day administration of a nationalized industry should not be allowed in the House. He submitted, however, that so serious a breakdown was a different matter, and that a new principle had arisen. The Member for Withington stated that he also had had the same experience when he required information about coal.

The Speaker said that with regard to the first Member, the Electricity Board had given the reasons to the public.

Several Members joined in an interchange, and the Member for Warwick and Leamington pointed out that there appeared to be a line between what was a matter of day-to-day management and when a matter of nation-wide concern arose; with the latter, he suggested, they had a duty to put questions forward. The Member for Oxford remarked that whether industries were nationalized or not, were they not entitled to question widespread dislocations?

The Member for Shettleston commented that the Forces were nationalized Services and that Members could put questions to Ministers concerning them. If industries were to be nationalized, he continued, it would be a most convenient thing for any Government if they were not allowed to be asked questions about them; the House would be in danger of drifting into something like the Reichstag.

The Lord President of the Council replied that he would look into the matters raised, though, he added, he was most anxious to avoid the practice of putting questions on fairly small matters relating to the day-to-day management of industries. Such questions would demoralize the great undertakings and would really make them "Civil Service and red tape" in their outlook. Mr. Morrison promised that he would look into the matter and see if a solution was possible.

The "Save Electricity" Poster

On May 27, the Member for Hornsey asked the Minister of Fuel and Power if, before sanctioning the issue of the new electricity poster, he had consulted the Safety First Committee, or any of the Government's committees dealing with the well-being of children. Mr. Gaitskell pointed out that the poster was issued by the British Electricity Authority, and not by his Department, whereupon the same Member asked if it was right for the taxpayers' money to be spent on inducing children to clamber on to chairs to turn off lights that were already off . . . and to run the risk of breaking their necks. The Minister said that he would issue no directions on posters to the British Electricity Authority. Another Member suggested that the word "Daddy" should have taken the place of the word "Mummy" on the poster, while still another asked if this was the opening round in a campaign to teach children to snoop on their parents.

The Member for Canterbury asked the Minister if he would give the tonnage of coal lost through disputes in the first quarter of 1948 and in the same period of 1947. Mr. Gaitskell gave the respective figures of 313,900 tons of saleable coal in 1948 and 133,800 tons in 1947.

The Member for Kingston asked if Mr. Gaitskell would publish the correspondence between Sir Charles Reid and the National Coal Board, leading to the former's resignation, but the Minister said that it was a Coal Board matter which they did not propose to issue to the Press. The Member pointed out that public disquiet on these happenings was greatly magnified by the policy of hushing up everything connected with the Board.

Mr. Gaitskell met that point by saying that it would not be part of his duty to extract private correspondence between a member and the Board. The Member for Torquay: "Are not the people of this country who own the mines entitled to know what their senior managers think on this matter?"

When the Member for Mile End asked the Minister of Supply, on May 31, whether he would state when legislation to nationalize steel was to be introduced, Mr. Strauss said that he had nothing to add to the statements made by the Government on the subject. Mr. Strauss added that he was not responsible for what the Press wrote about nationalization; the position had been made perfectly clear by the Prime Minister at the opening of the Session.

On June 8, the Member for Orpington asked the Chancellor of the Exchequer if, in view of the fact that dollars were made available to the National Coal Board for the purchase of conveyor belting in excess of requirements, he would review the system under which dollars were allotted; what was the estimated loss in dollars; and what steps would be taken to punish the persons responsible. Sir Stafford Cripps referred the Member to a reply earlier.

On June 8, the Finance (No. 2) Bill was considered in Committee. The Member for Hitchin raised the question of purchase tax on gas water heaters; hot water, he said, is essential to-day, and if it is not created in one form it will be created in another. Gas, he continued, is the most economical form of water heating that exists; "But the very great tax of 100% on gas water heaters is having a really unfortunate effect on the future prospects of a very excellent industry, which I am informed is looking forward to the future with some trepidation." The speaker went on to point out that the purchase tax was the least convenient way of restricting the installation of electrical equipment; to him, the better way would be by making a statute forbidding new installations. The Member ended by putting in a plea for gas fires which, he affirmed, were an economical way of heating—more economical than coal fires. Other Members spoke on this subject, and later Mrs. Corbet, the Member for Camberwell, North-West, said that she was rather like the Minister of Fuel and Power in that she had never felt able to indulge in a bath very frequently because she had no means in summer of getting adequate hot water. She had an electric immersion heater, "but I found it so expensive and it consumed so much electricity that I felt that in the interests of the nation it was not vital to use it." Mrs. Corbet added that the gas industry was not in the same troubles with the supplies of its fuel as electricity.

The Economic Secretary to the Treasury said that some case had been made for a differentiation between gas and electrical appliances; they could not consider a reduction of the tax on the latter, but would consider a reduction from 100% to 66⅔% on gas space and water heaters. This reduction was subsequently confirmed.

The Railway Executive, faced with an increased output of coke, has decided to augment its existing stock of coke carrying wagons by the conversion of 1,000 mineral wagons for the transport of this traffic.

NEW VERTICAL RETORTS AT ARDROSSAN

THE official opening of the new Glover-West vertical retort installation at Ardrossan, on June 19, by Provost James A. Cunningham, of Ardrossan was followed by a luncheon at the Eglinton Arms Hotel. The company included representatives from the contractors, local authorities, gas engineers and managers, and officials from the Scottish organizations.

Sir **Frederick J. West,** G.B.E., proposed the toast of " The Town and Trade of Ardrossan," and said he believed that town and trade were dependent on each other. The Town Council controlled the development of the town, with the development of the town's trade keeping in step with the whole organization. He urged a greater interest by the public in local affairs, indicating that this would greatly aid the development of a town. Speaking of nationalization he thought it was regrettable that in the future handling of the gas industry the interest of public authorities would be lost.

The **Provost,** replying to the toast, said he was proud to have been asked to open the new retorts in view of the fact that he had a great interest and, he thought, had helped in their building. He outlined his efforts to obtain authority for the new installation and told of the many Ministry officials he had to interview before receiving authorization. The building of the new retorts was planned before he came into office, and he congratulated ex-Provost Ferguson and Mr. R. Sturrock, Engineer and Manager, on their work in the planning of the new retorts.

Ex-Bailie **John Weir,** proposing the toast of " The Gas Industry," said that when he was convenor of the Gas Committee he met many in the industry and was greatly impressed by their ability and skill. He thought everyone was of the opinion that some integration of tha gas industry was necessary, but whether nationalization could achieve this remained to be seen. No one wanted to see nationalization meaning a higher cost to the consumer, as seemed to be happening in the electrical industry. The new works, he said, would go a long way in strengthening the industry.

Mr. **Harold S. Milne,** President of the North British Association of Gas Managers, responding to the toast, said that since the industry's early days there has been no lack of enthusiasm. The steady progress of the industry during the 18th century depended mainly on the use of gas for lighting. Great changes were pending in the industry and he believed that a great deal more could be done if undertakings were joined.

Tribute to Contractors

Mr. **Robert Sturrock,** Engineer and Manager, proposing the toast of "The Contractors," said that West's Gas Improvement Company had carried out a very fine piece of work. The plans for this development were being discussed before the war, but unfortunately before the matter could be fully settled war was declared, and the plans had to be set aside until 1943, when permission to fix a contract was obtained. Owing to shortages, however, they were unable to get a contract through until 1945. The results since the retorts went into operation in February had been very gratifying and were, in fact, at present beyond the guarantee made by the contractors. He was glad that his brother, Assistant General Manager of the United Kingdom Gas Corporation, Wakefield, was able to be present.

Mr. **Ernest West,** replying to Mr. Sturrock, thanked him for his kind words in appreciation of his company's work. He said that in walking round the works he was surprised that the Engineer and Manager had been able to keep the town supplied for so long.

Mr. West then presented the Provost with an ashtray, fashioned in the form of the retort, to mark the occasion.

Treasurer **John Beggs** proposed " Our Guests," and thanked all those present for their interest in the opening.

Mr. **David Fulton,** Chairman of the Scottish District, British Gas Council, in reply, said that the plant was a tribute to the skill and ability of the contractors. The Government would not be able to say, in taking over the Ardrossan works, when nationalization came, that they were taking over " a poor bag of physical assets." The industry was on the eve of great changes. Although the past of the industry was excellent, the future would be even more so. It was unfortunate to lose personal contact in the industry, but when nationalization came, the undertakings would still be in charge of those who had been in them since the beginning.

Councillor **J. Armstrong** proposed the toast of "The Chairman."

Description of Plant

The contract was entrusted to West's Gas Improvement Company in October, 1943. Authorization to proceed was granted by the Ministry of Fuel and Power in August, 1945, and the plant went to work last February.

The installation consists of six Glover-West retorts arranged in single line so that each retort is a single and independent unit, each with a daily output of 84,000 cu.ft. per mouthpiece, and a total nominal capacity of 500,000 cu.ft. per day. Within the present house provision is made for a further extension of three retorts, making a total daily capacity of 750,000 cu.ft. The retorts are of the 40 in.-46 in. model, 25 ft. long, built in Stein's silica and fireclay material.

Two producer gas generators of the pressure type, one acting as standby, supply the fuel gas requirements. An augmentation flue is led from the main producer gas flue to cover the peak load steam requirements, and producer gas dampers are conveniently placed for easy control.

The railway siding runs parallel with, and is immediately adjacent to the coal store, enabling wagons to be emptied easily into the coal store. A spacious underground pit has been arranged with the new installation and the electric hoist descends to cellar level. The coal bogies are filled in the tunnel by coal valves suspended on the underside of openings in the coal store floor. Coal is transported to the overhead storage bunkers by a 25 cwt. fully automatic electric hoist. On the bunker platform a weighing machine registers the weight of coal delivered to the coal storage bunkers, which are of 48 hours' capacity.

Coke is elevated to the producer feed hopper also by means of the electric hoist. The producer feed hopper contains 12 hours' supply and at its outlet a weighing machine indicates the weight of each skip of coke so that a close and continuous check can be made of the fuel fed to the producers.

The waste heat boiler placed at stack level is of Spencer Bonecourt natural draught horizontal type, capable of a total evaporation of 1,800 lb. of steam per hour, from and at 212° F., at a working pressure of 120 lb. per sq. in. An augmentation flue allows this unit to work either solely as a waste heat boiler or with the addition of surplus heat whenever increased evaporation is required.

The boiler is fully mounted with the usual range of fittings and duplicate pumps. The " Thermo-feed " regulates the water supply to the boiler and keeps the level constant. The Hilo alarm equipment sounds a warning note if the water within the boiler should, by some outside cause, reach an excessively high or low level. The evaporation of the boiler can be regularly recorded by means of the water meter provided between the feed tank and boiler.

In an observed period over 72 hours the following results were obtained under normal working conditions:

No. of retorts in operation	4
Steam pressure to retorts	15 lb. per sq. in.
Coal carbonized	39.50 tons
Gas made (at 30 in. Hg. and 60° F.)	714,000 cu.ft.
Gas made per ton of coal carbonized	18,080 cu.ft.
Average calorific value	437.9 B.Th.U.
Therms per ton	79.16
Total coke made	23.48 tons
Coke made per ton of coal carbonized	11.9 cwts.
Total steam to retorts	11.370 lb.
Percentage steaming of the charge	12.85%

The extractors are operated through a reduction gear driven by two Sisson totally enclosed steam engines, one as a standby to the other. Two tar and liquor pumps, for alternate use, are provided for flushing the gasways.

The retort house building is built in Sanquhar and Kirkconnel first quality terra cotta bricks which, with the white Snowcrete lintels and sills provide a pleasing contrast, and the general design of the building exterior harmonizes admirably both with the older portion of the town and the new housing estates adjoining the gas-works. The special inverted roof is another modern feature which ensures an adequate supply of fresh and clean air for operators at all times.

INDUSTRIAL AND COMMERCIAL GAS

The Industrial and Commercial Gas Section of the American Gas Association sponsored a conference on Industrial and Commercial Gas which was held recently at Windsor (Ontario). The first to be held on Canadian soil, the conference was attended by over 200 people.

At the general session, papers were presented of interest to both industrial and commercial gas men. A talk entitled " Let's Take a Look at Research " dealt with research being undertaken at present, and with future prospects of furthering gas utilization and meeting competition. The former A.G.A. Industrial and Commercial Publicity Director dealt informally with delegates' questions. Another speaker stressed the need for bringing sales methods up to date.

The first and last day of the conference were devoted to technical papers for industrial and commercial gas men respectively, with speakers from within and outside the gas industry. The Illinois delegate gave a summary of Project IGR-58, an important research report dealing with induction heating in relation to industrial gas heating. The Cincinnati delegate read a paper on " Industrial Paint Drying," and a well-known manufacturer of industrial ovens told the conference about a comparatively new use for industrial ovens in the field of curing and smoking meats and meat products. Main items on the commercial gas programme were a paper on " Self-service Laundry," and one dealing with hot water installations in restaurants, entitled " Hot Water a la Carte," and a forum on appliance servicing.

FUNCTIONALISM AS A TOOL OF MANAGEMENT*

By C. H. LEACH, M.A.(Oxon.), A.C.A.,

General Manager and Secretary, Liverpool Gas Company

C. H Leach

THIS paper deals with functional integration within the Liverpool Gas Company, and is intended to illustrate benefits accruing therefrom.

A short definition of "functionalism" is the placing of the whole responsibility for all activities of one type upon a single official.

Functionalism can be achieved by dissecting the work carried out in an undertaking into units of activity, by integrating all like units, and by placing the responsibility for the efficient execution of each group of activities so integrated in the hands of a single specialist. The principle is applicable to any undertaking, irrespective of its size; in larger concerns the consequent size of the work within a function may mean the appointing of lieutenants to overlook sections of a function, the sections being determined either sub-functionally or on geographical or numerical bases. The essential is to have one executive, and one only, responsible to the higher management for the welfare of the complete function. In smaller concerns there will usually be no question of establishing sections, and, in fact, it may well be that one executive may be held responsible for more than one function. This is still functionalism, as the requirement of single responsibility is satisfied, but the smaller undertaking must suffer the handicap of finding it uneconomic to employ a specialist to control each functional group of activities.

The Liverpool Gas Company

The estate of the Liverpool Gas Company consists of four manufacturing works (no coke oven gas is available), three district holder stations, two district showrooms, a central service garage, a central store, an appliance repair shop, and Radiant House as head office and main showroom.

The area of supply (100 sq. miles) is roughly semi-circular and bounded as to the diameter of the semi-circle by the River Mersey, and contains 70,000 credit customers and 170,000 slot customers, who consumed, in 1947, through 1,300 miles of main, 45 million therms, 68% of which was for domestic use and the balance commercial and industrial; the foregoing figures are approximate.

The published price of gas is 11.6d. per therm, and has been that since July 1, 1945. Details of the 2,096 employees on the pay-roll in February, 1948, are as Plan A (next column).

In 1940 conditions were altering quickly, and it appeared inevitable that man-power and supply shortages would develop; thus all available resources had to be mobilized and (in the recent words of Field-Marshal Montgomery) " all the muckage stripped from the problem."

The four main objects of a manufacturing gas undertaking can be defined as:

(1) The making of gas and by-products as efficiently as possible.
(2) The distribution of gas as efficiently as possible.
(3) The promotion of all sales; and
(4) The performance of essential administrative duties.

Once these four main objects are accepted, it appears logical that the achievement of each should be made the separate responsibility of one person, and one person only. In the Liverpool Gas Company these objects are carried respectively by four divisional heads:

(1) The Gas Engineer,
(2) The Distributing Engineer,
(3) The Sales Manager,
(4) The Office Comptroller,

each answering to the Directors through the author of this paper for the proper achievement of his object.

It is essential that such divisional heads should be answerable to one full-time chief executive who acts as an impartial co-ordinator to ensure single-mindedness of purpose in carrying out policy and establishing priorities for their widely differing calls upon the resources of the undertaking in men, materials, finance, space, &c.

The many activities in the undertaking entailed in carrying out these objects have been grouped under these four divisional heads in a way considered the best to enable each to fulfil his purpose. Answerable to them, either directly or indirectly, are executives responsible for the detail work which has been allotted to them functionally.

If unlike units of activity, on non-functional lines, are allocated to an executive, he may devote a disproportionate amount of his time to one unit, to the detriment of others, either because he likes it or because he, and not necessarily the management, considers it to be his forte.

This may well have two serious effects: unfairness to the man who, in making his selection, may attract blame for inattention to a non-preferred unit, and difficulties to the higher management in that consideration of even the simplest problem may have to range over many people carrying portions of responsibility in that problem. Everybody's job is nobody's job, and thus, if management desires that all activities be pursued with equal diligence, the only solution appears to be " functionalism." To employees this at once offers the possibilities of meriting advancement by becoming specialists in one particular activity, to which their whole energies can be devoted, and to the higher management the ready opportunity for close study of any activity within a smaller and better-defined field either for increasing the activity or decreasing it, or for improving the way in which the activity is performed, or, better still, for discontinuing it, either wholly or in part.

Further, when one executive only is responsible for a particular function, as against the work being carried in many parts of the undertaking by a number of officials, it is easier to promulgate managerial policy, and only one man has to be infused with the desire to operate the function as economically as possible as to man-power, materials, capital investment, and other overheads, by discarding superfluity. This official, in his turn if carefully chosen, will pass

PLAN A

Operatives (including supervisors)—				
Gas Engineer's Division:				
Gas-works			768	
Construction and maintenance department			141	
			—	909*
Distributing Engineer's Division				213
Sales Manager's Division:				
Gas and appliance maintenance fitters			160	
Appliance repair shops			53	
Transport			100	
			—	313
Office Comptroller's Division:				
Stores			53	
Porters and cleaners (including offices and works)			54	
Meter readers and collectors			96	
			—	203
				1,638

Technical and clerical staffs—	Male	Female	Total	
Gas Engineer's Division	64	28	92	
Distributing Engineer's Division	24	4	28	
Sales Manager's Division	78	67	145	
Office Comptroller's Division	77	114	191	
	243	213	—	456
General Manager and Personal Secretary				2
Total				2,096†

* From Communication No. 336 of the Institution of Gas Engineers. Presented at the Annual Meeting in London, June 9, 1948.

* The equivalent of 20 men per million therms sold in 1947.
† The equivalent of 46.5 employees per million therms sold in 1947.

A MODERN RETORT HOUSE —
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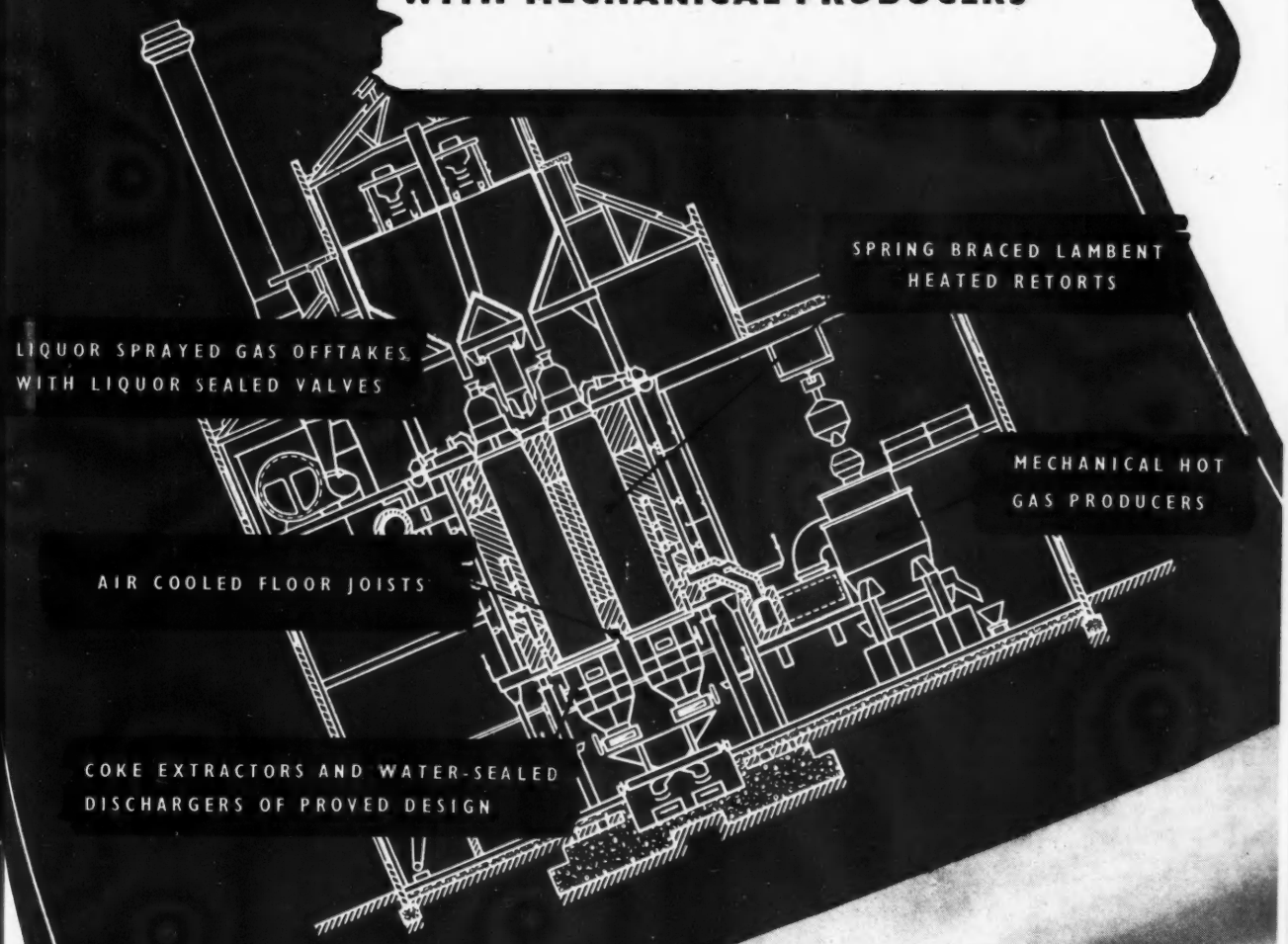
SPRING BRACED LAMBENT HEATED RETORTS
LIQUOR SPRAYED GAS OFFTAKES WITH LIQUOR SEALED VALVES
MECHANICAL HOT GAS PRODUCERS
AIR COOLED FLOOR JOISTS
COKE EXTRACTORS AND WATER-SEALED DISCHARGERS OF PROVED DESIGN

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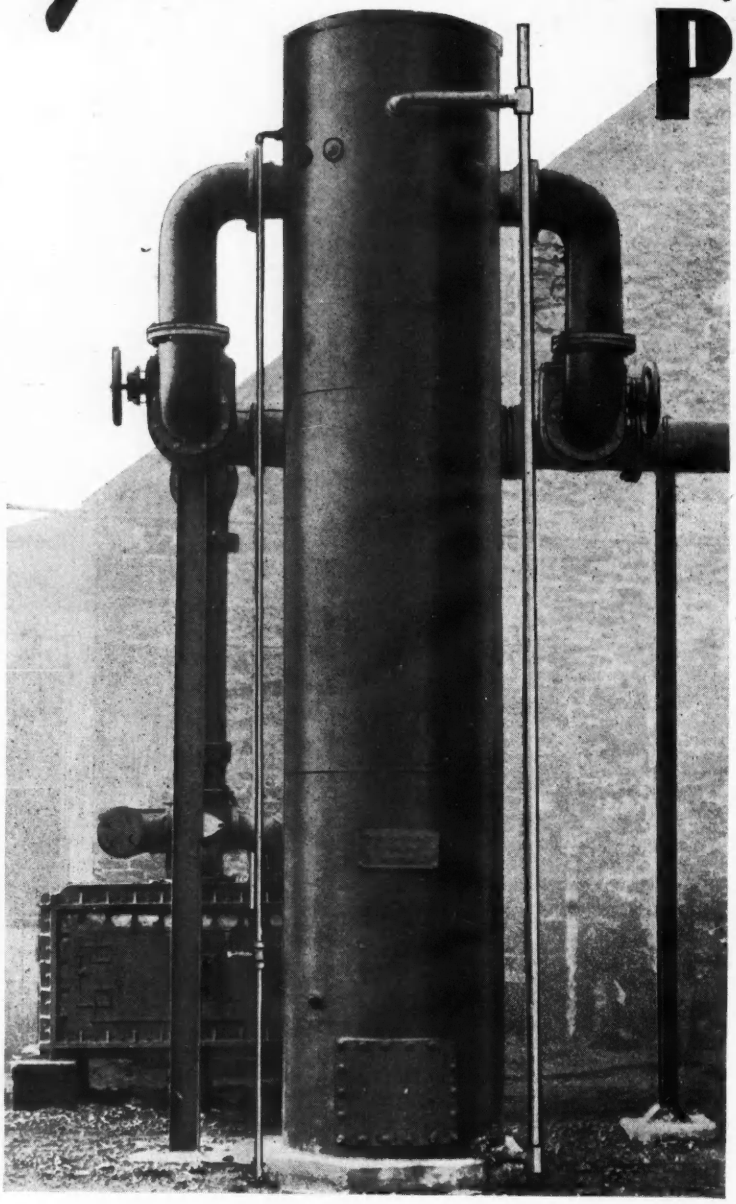
W-D. 18

Gas Cooling PLANT



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The illustration shows a vertical tube condenser with welded casing. The capacity is 250,000 cubic feet of gas per diem.

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his enthusiasm down the line, and so all the personnel involved in that function are more readily bonded together as a team. Additionally, that official, with a full knowledge of his subject, is available for contact with outside bodies, a procedure now greatly facilitated.

There are certain standard objections to functionalism, the main one perhaps being in the the possibility of a clash of personalities where functions, if not too clearly defined, tend to overlap, and, as has been sometimes said, "functions become factions." Nevertheless, it was felt that the advantages more than outweighed the disadvantages, and where differences of opinion have arisen it has been possible to derive strength by integrating points of view, on the lines suggested in that admirable book "Dynamic Administration"* by Mary Parker Follett.

Functionalism is not an end, and does not of itself produce economies; it is merely a tool, a tool which, if carefully tempered and properly used by an active and determined management, will promote economies.

Efficient manufacture of its products is the foundation of the gas industry, and in this paper it will be seen that, by means of functionalization, consistent efforts have been made to relieve those directly engaged in engineering and manufacture of all extraneous duties which otherwise would distract and divert them from that work for which they have received their highly specialized training.

Careful thought has been given to the weight and sequence of the four main sections which follow, and the author eventually decided on the present form, as it was felt it would best illustrate the way in which functionalism can serve the members of this Institution. Had the author been delivering this paper to a body whose prime training had been in administration rather than in production, the weight and sequence of the sections might well have been different.

The Office Comptroller's Division

Certain activities sometimes thought either wholly or in part to be within the jurisdiction of other divisional heads, have been stripped from them and gathered under the Office Comptroller, and whereas this might at first glance seem to have detracted from the ostensible authority of those previously responsible, yet, in fact, by so doing each is given more time to "keep his eye on the ball" by removing sources of harassment, and thus opportunity is afforded to increase his stature in the achievement of improved results in his inescapable main duties.

As the wisdom of this stripping operation is sometimes questioned, comment will be made on some of those activities before passing to others which seem to call for special description.

Pay-roll Production

As this paragraph is being written in February, 1948, at a time of maximum gas sales, there are 2,096 employees, plus 462 pensioners, on the pay-roll, and the entire pay-roll production, wage, tax and holiday records, State insurance cards, co-partnership and pension records, &c., are kept by two senior officials, with six assistants, working a five-day 37½ hour week.

In the author's view, much clerical work should be treated as the production of dirty marks on pieces of paper, and one way to achieve economy is so to group, prune, and rearrange this clerical work that it becomes a line production job in the charge of specialists aided by diluted labour.

When the preparation of pay-rolls as a centralized function was projected, it was being carried out in 10 different departments under differing divisional heads, and nearly 300 manual-labour rates existed; differing interpretation of union rules was rife; a multiplicity of stationery forms existed; monthly payment was restricted to a few salaried employees and some pensioners; pay-roll production was a series of peak operations, and inaccurate pay envelopes were all too frequent. This was understandable as the work was regarded as a part-time necessary evil in scattered departments trying to concentrate on their true activity.

Integration was not achieved overnight, but a nucleus staff was formed which absorbed seriatim the 10 units. The departmental heads welcomed the relief immediately; no more would they be bothered by this sideline of wage ascertainment, and thus more of their time could be devoted to their main duties.

Then followed a motion study within the now small confines of the new Wages Department in which superfluous records came to light and were discarded; the manual rate structure, now seen as an entity for the first time, was rationalized to some 80 rates by eliminating trivial differences between contiguous rates, as obviously these trivial differences could not be reflective of job assessment; all weekly paid permanent staff members and pensioners (several hundreds) were transferred by arrangement to monthly payment by cheque, an obvious saving of 40 wage calculations per person per annum; an extra weekly pay day on a Tuesday was introduced to facilitate an even flow of work throughout the week; mechanization became economic and was introduced in the form of one book-keeping machine for the pay-roll and one insurance card franking machine, controlling all State insurance contributions; the stationery was reduced to a minimum of differing forms, with obvious reductions in the multiplicity of stocks to be ordered and held; interpretation of union rules became consistent; such accuracy was realized that pay-envelope complaints virtually disappeared.

The alterations made—some of great significance—involved major decisions by the management. For example, the ante-dating of the close of the pay week for manual workers by two days, so as to lengthen the time available for pay-roll production and thus flatten a peak, and also to make the pay week coincide with the State insurance week for ease of deduction calculation, was only achieved by sympathetic treatment of the men affected after friendly negotiations with the unions concerned.

Changes necessary to effect any repetitive economy, however small, should not be shelved just because of one-time initial difficulties in their introduction, and this precept is of universal application. Management must not take the easy way and by so doing discourage executives and cramp their inclination to make other constructive suggestions in the future.

Finality in a pay-roll, or indeed any department, owing to changing conditions, may never be reached, but variations necessary to take care of any new circumstance—a changed union agreement, say, or alterations in P.A.Y.E.—are greatly facilitated by the ease of studying pay-roll preparation as a functional entity on one site under the control of one executive. Similar facilities obtain, of course, in the study of any series of activities which have been grouped functionally.

Buying and Stores Control (excluding Coal, Gas Oil, and Oxide)

The buying, control and handling of materials was originally dispersed, and no overall picture of stocks, as to sources of supply, variety, or quantities held, was available. Each official in charge of direct work did his own buying and operated his own store or stores; the disadvantages were numerous and costly, but savings immediately flowed once this activity was regarded as a function and had been integrated under one buyer with control over all stores and stores personnel. Officials welcomed the relief from the worries attendant upon this sideline of buying, such as interviewing salesmen, store keeping, records, correspondence, stores personnel control; and again they were enabled to devote more time to their true activities.

The customary minute survey now became practicable, and changes evolved. Instead of many self-supporting units, one store became a central store, and any others still deemed necessary became decentralized satellites carrying smaller stocks, backed up by the central resources. Bulk buying was introduced, with attendant price benefits, and at once the number of lines carried (each with its reserve stock) fell, valuable space was freed, the number of orders and invoices dropped, as did the correspondence and accounting work. With the central knowledge of all stocks, it was often possible to satisfy the demand of one depot for items from existing stocks at another depot, thus saving ordering and delay; owing to the over-all reduction in reserves carried, the capital investment in stocks fell significantly, with a *pro rata* reduction in obsolescence and man-power for handling, recording and inventory work.

Canteens and Contracting Out

Originally six canteens (four at the works, one at the appliance-repair shops, and one at Head Office) operated independently, each answerable to the official in charge of direct work at the location and diverting him from his main activity.

Prices to the operatives for similar services varied from canteen to canteen, and with no uniformity of skill in operation the subsidy policy was difficult to control. Integration under a functional head was welcomed by those previously controlling canteens as a sideline, as it relieved them of trouble. Also, it cleared up anomalies and resulted in a reduced subsidy by reason of increased efficiency, together with an improved service in the canteens themselves.

After functional canteen control had operated for a period, it was possible to review the whole function, not so much as to its efficiency, which by this time was felt to be the optimum achievable by this method, but as to the desirability of carrying the function at all.

In the gas industry we consider ourselves, rightly or wrongly, to be specialists in gas manufacture and supply, and we would properly deprecate a user of our product building his own gas-works. There

* "Dynamic Administration," Chapter I ("Constructive Conflict").

is no need to set out here all the cogent arguments which we would bring forward to persuade this user from entering a specialized field, divorced from his own speciality. We would refer to the wealth of knowledge in our industry, and the trained personnel available to us for efficient working and with which he could not hope to compete.

In reverse, these arguments seemed to apply with equal force against our operating canteens in the specialized field of industrial catering. I can imagine the arguments which the President of this Institution would bring forward if the Liverpool Gas Company, as amateurs, contemplated making gas appliances. In the catering field, therefore, why should anybody in the undertaking be harassed by this function? And so the entire job was handed over to one of the largest professional caterers in England. After the initial difficulties of the transfer had been surmounted, the relief to the author and to his executives was unbelievable. No accounting, no personnel troubles, no wage payment, no coupons, and, at last, the subsidy under control and the meals improved, all due to professional operation as against amateur, and with a reduced number of operatives engaged on the work.

This principle of passing out a function to an outside specialist, which I term professionals *versus* amateurs, is a significant one and is widely used at Liverpool whenever it is possible to consider that the carrying of the function by the undertaking itself is not essential to the four main objects, and where outside specialists of integrity exist who properly make their living by carrying out that class of work efficiently.

Apart from the previously mentioned advantages which derive from contracting outside, a greater degree of flexibility of operation accrues to management in that the amount of work which it is desired should be done within the function can now be varied up or down at will within the much greater ability of a number of contractors to absorb change, as compared with varying one's own direct work with the attendant problems of recruitment or redundancy and space requirements for the personnel.

To my mind, a significant factor in the increased efficiency is a psychological one—namely, that if a gas undertaking employs an operative in a sideline, that operative knows subconsciously that the well-being of the undertaking (and thus of himself) does not hinge on his output; and the same applies to his supervisor. If, on the other hand, an operative and his supervisor are employed by a firm which specializes in that class of work, and thus stands or falls by its output, then a different psychological background is created, with a wholly beneficial effect on the output per man hour. Hence the author is averse to vertical expansion as a general principle.

Once the principle of contracting out is recognized, many opportunities for its useful application become evident. It was found that there were numerous activities, some calling for a limited amount of full-time direct labour, with the attendant difficulties of supervision, and others calling for part-time direct labour, with the additional difficulties of finding useful occupation for the remainder of the week, and when these were passed out relief was experienced by the local managers. I would instance:

(i) Window cleaning.
(ii) Maintenance of bowling greens.
(iii) Clock and instrument maintenance.
(iv) Coke-bag repairs.

The four jobs mentioned above are now better done by professionals than at any time previously by the Company's amateurs.

These instances may be regarded as trivial, but it is emphasized that they are merely examples, and the cumulative effect of applying this principle consistently is considerable and not only results in a reduction of man-power employed directly by the undertaking, and all that hangs on employment of personnel, but, because of the greater efficiency of the professional, in a reduced employment of man-power nationally, with a better job for the Company at a reduced cost.

Personnel and Welfare Department

Personnel management, being a reasonably new facet of administration and largely promoted during the war, is generally admitted to be, and practised as, a standard example of functionalism; consequently, one hardly need touch on this subject, as the advantages of having a clearing house, with uniform handling for all these problems, have already received adequate publicity elsewhere, but it must be added that direct work officials when stripped of this burden invariably welcomed the relief.

For example, the whole of the intake of new clerical labour from the Company's pre-entry training school, inaugurated at the beginning of the war for the training of prospective juniors while still attending their day schools, is allocated to the Office Comptroller. The Personnel Department is the agency for co-ordinating labour requirements, and thus it is through this department that trained clerical personnel are transferred from the Office Comptroller's staff to fill vacancies in these other departments, thus relieving the departmental heads of the difficulties of recruitment and the provision of basic training.

Costing

This activity is regarded by the Liverpool Gas Company as a co-equal function with financial accounting, because costing entails a close analysis of all expenditure in agreement with the financial accounts, but presented in such a way as to facilitate increased efficiency. This work was carried out, in part only, by the various direct work departments, without specialized knowledge of costing, or any attempt at uniformity of presentation, and was greatly restricted in utility to the higher management; nor was there, with the lack of centralized facilities, any tie-up with the final accounts.

This activity, when fully developed as an entity, not only relieved the direct work departments of a distraction, but, being under unified specialist control, became for the first time of real use to these direct work departments owing to a more comprehensive and clearer presentation, and also, for the same reasons, to the higher management in assisting quickly to detect weaknesses.

This is not the place to dilate upon the very real advantages which can be made to accrue from costing. It should be added, however, that it is the author's strong belief, based on experience, that these advantages can be readily forthcoming only where costing is a centrally controlled function within a functionalized undertaking, as this set-up facilitates the costing of any activity as a unit by restricting the investigation to one department or sub-department, and only one executive is answerable to the higher management for the results of an activity.

For example, imagine the difficulties of assembling the costs even of wage payment when parts of the cost are carried in 10 different departments; it is only by assembling all the costs of one complex activity in a form which gives the description of every motion and its relative magnitude expressed in £ s. d., that one can be assured of having every motion which goes to make up that activity, and which calls for the use of man-power or material directly or indirectly, available for inspection, and, if thought fit, for improvement by alteration or elimination.

Only at Head Office was there any positive supervision of the cleaning staff, whereas at the other locations the responsibility for this work was nominally under the direct work heads, who regarded it as a necessary evil. There was no uniformity of working conditions for the operatives engaged, nor any uniform standards of cleanliness. Functionalization under the existing Head Office supervisor had the customary effect of relieving direct work officials as well as removing the anomalies mentioned in the previous paragraph, and, as I have invariably found, there was an immediate disclosure of overemployment when the job was surveyed as a whole by a specialist carrying sole responsibility.

The function was afterwards reviewed with the idea of contracting outside on the usual grounds. Unfortunately, there is no local firm which carries out this type of work, although I know that such firms exist in other parts of the country.

The author has—to this point—restricted remarks to functions stripped from divisional heads and brought under the Office Comptroller. Later, reference will be made to functions so stripped and given to other divisional heads, but this section will now be closed by referring to certain other functions normally under an Office Comptroller or his equivalent, but rearranged at Liverpool to obtain the maximum advantage accruing from this tool called functionalism.

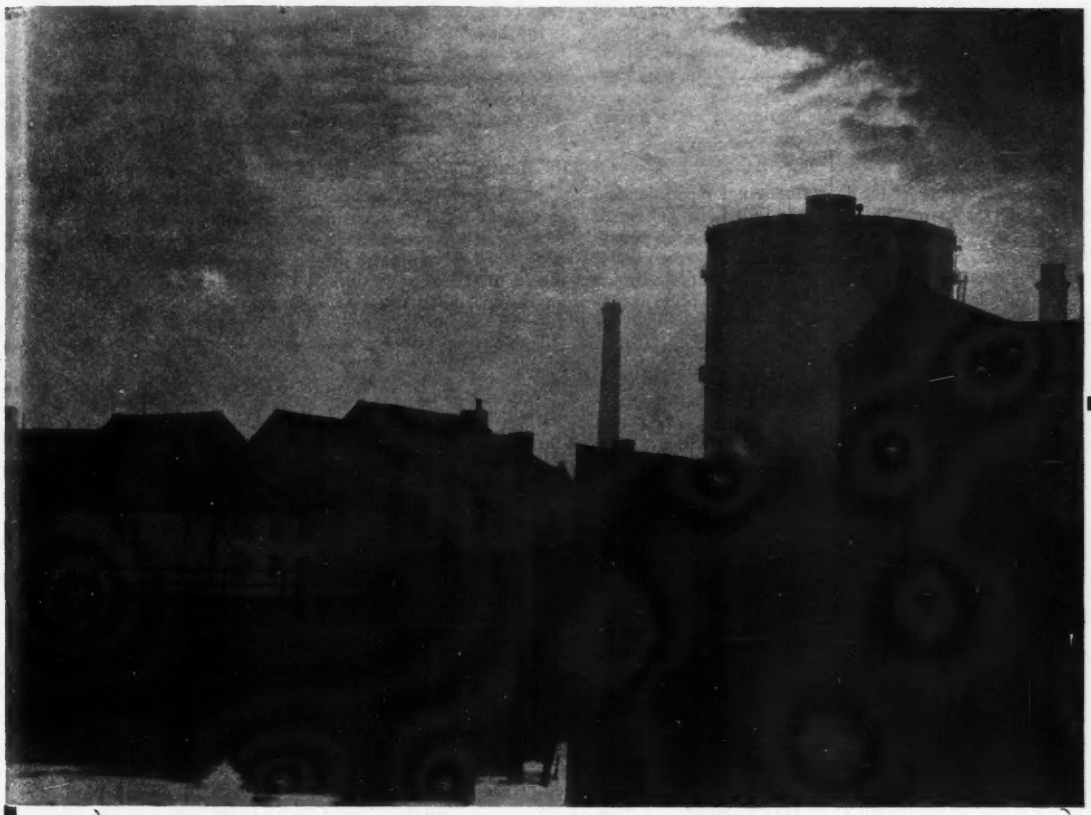
Stock Registration and Dividend Payment

Stock registration and dividend payment have been handed over to a firm of professionals. The annual charge to the Company is now less than the prime labour cost of this operation when previously carried by the Company, without taking into account the benefit of the floor space and office equipment now released for other work, and relief afforded to the author personally.

Regarded as a whole, ascertainment and collection of revenue—an essential feature of a gas undertaking's work—seems complex, but can be readily divided into four main activities.

(*w*) Billing credit customers for gas, residuals, hire purchase, &c.
(*x*) Reading and collection of slot meters.
(*y*) Reading credit meters and collecting delinquent accounts.
(*z*) Clerical accounting for slot-meter customers.

Originally, this work was carried out as to (*x*) plus (*z*) under a slot rental superintendent, and as to (*w*) under a quarterly rental superintendent, and (*y*) under a quarterly meter inspectors' superintendent; in all, three executives. This, at first glance, appears to be a form of



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functionalism, but upon consideration it was rejected as a non-functional grouping of unlike activities. A regrouping brought all the district work (*x*) plus (*y*) under one executive, known as the meter inspectors' superintendent, and all the clerical customer accounting work (*z*) plus (*w*) under another executive called the customer accounting superintendent; in all, two executives.

Some advantages which derived from this regrouping are described briefly as follows:

(*a*) *Responsibility under Meter Inspectors' Superintendent*

Under the grouping (*x*) plus (*z*) the then slot rental superintendent was the prime arbiter as to whether a change in activity (*x*) would or would not affect activity (*z*) (and *vice versa*) to the overall benefit of the undertaking, but, with these activities under separate control and each functional head charged with operating with the maximum efficiency, the arbiter at any projected improvement necessitating change in (*x*) or (*z*) is at a higher level and unbiassed—namely, the Office Comptroller, or, if he thinks fit, the author, as General Manager.

With no clear-cut disctinction between clerical and district work in the slot department, men trained primarily as slot collectors were being prevented from spending their whole time at this task by being asked to mix collecting with clerical operations (the latter, for which they were not necessarily fitted, being carried out under unsuitable conditions on the district) to the detriment of the overall results. After stripping these men of such clerical activity as could properly be done in the office, with, at worst, no overall loss in efficiency, the results were no longer masked and it was possible to introduce a premium bonus plan with beneficial results.

Hitherto, in the credit-meter reading department, the head had retained in his section an adequate reserve of man-power to cover absenteeism arising from holidays and sickness, &c. As a result, this reserve had to be found work when not engaged on schedule reading, and thus a system of taking regular check readings at mid-quarter dates had been promoted. This extra work had been a feature of the department for so long that its original objects were obscured, and by this time the checking had come erroneously to be regarded as an essential operation. Under the regrouping, it was possible to decide that no such reserve was necessary, and occasional man-power needed to maintain the rigid continuous credit-meter reading schedule is obtained by temporary transfer from collectors to readers without in any way harassing slot collection, thus eliminating the self-created problem of the check readings and, of course, the personnel necessary to carry them out.

Unfortunately, in Liverpool, there were, at the time of the regrouping, included in the 70,000 credit meters, some 30,000 wet meters (now reduced to 12,000 and steadily being replaced as dry meters become available), and each of these was watered at the time the reading was taken—*i.e.*, four times per annum. To water these meters less than four times per annum at that time would have given rise to serious difficulties in arranging a proper day's work for the men so as to adhere to the continuous reading schedule.

It was decided that watering meters should be stripped from the meter readers and transferred to a separate section, and, further, that it was only necessary to water twice instead of four times per annum, thus materially reducing the overall costs of meter watering to the undertaking. At the same time, this stripping prevented the meter readers' results from being masked by a job of scattered and reducing incidence, and so, after "HiLo" investigations and similar clerical work had been stripped from the readers as from the slot collectors, it was possible to introduce a premium bonus plan for meter reading, which is a now a straightforward job without "muckage."

Indeed, the minute survey of his function made under the meter inspectors' superintendent, with the aid of the costing function, pointed the way to many changes of short and long term significance, the most important perhaps resulting in the proportion of silver collected from slot meters being increased from 5 to 90% of the total, with the consequent ability to lengthen appreciably the periodicity of collection, elimination of the full-box problem, and so a material reduction in the personnel employed.

During the investigation to eliminate useless operations, attention was drawn to there being many slot and credit meters on which little or no consumption was being recorded, thus promoting repeated and unnecessary meter inspections; all such cases were canvassed and some thousands of meters were recovered for more useful work, a welcome benefit at a time of acute meter shortage.

Indeed, a separate paper could be given on the results accruing from the investigation into meter reading and slot collection; sufficient, perhaps, to conclude this section by saying that 170,000 slot meters are now collected both as to routine and special collections by less than half the original staff, the men doing all their own banking, no motor-vans being used to relieve them of cash on the district, as the author is satisfied that the use of vans for this purpose at Liverpoool would be uneconomic. In addition, the 70,000 credit meters are read, and the bills delivered, by eight men in all working a 37½-hour five-day week (direct bill delivery being speedier and £1,200 per annum cheaper than using the postal service), and the delinquent accounts collected by three men.

(*b*) *Responsibility Under the Customer Accounting Superintendent*

When activities (*z*) and (*w*) were under sepatate and distinct control, as against being co-equal functions under one executive, a conflict of interests was present as to whether a delinquent customer should be transferred from slot to credit, or *vice versa*, without perhaps due regard to the overall interests of the Company. Both departments maintained a separate and differing method of route indexing with differing geographical divisions, and also maintained their own absentee-labour pools. These defects were remedied under regrouping. With the functional head concerned only with customer-accounting clerical work, the whole problem was studied as an entity with a view to reducing the work involved.

In the light of the author's previous observation that much clerical work can be converted to the mass production of the minimum number of "dirty marks" on paper, a tendency to decentralize billing was arrested so as to obtain the greatest possible throughput for the expensive machines involved, and again, with line production as a pattern, such improvement was achieved in billing the 70,000 credit customers that the machine time needed on existing machines was reduced by more than 50%.

As an example of superfluous "dirty marks" on a bill, calling for unnecessary machine-key depressions, and consequently eliminated, the author would cite past meter reading, number of therms, details of rents (now included under "sundry rents" as one item), coding for rating area analysis, breakdown details of items previously invoiced but remaining unpaid at furnishing of the account (now included under "account rendered" as one item).

Notwithstanding the fact that the Liverpool Gas Company for other purposes is an extensive user of punched-card machinery, yet detailed examinations made of billing in England and in America both by the author and the Office Comptroller have convinced them that the economies of punch-holed billing cannot be realized without a centralized throughput vastly in excess of, and probably 10 times, Liverpool's 280,000 bills per annum. Thus the latest National Cash Register Company's machines have been reordered to replace ones of the same make but now reaching the end of their useful life.

The clerical work relating to the 170,000 slot customers is handled under the Customer Accounting Superintendent by two senior male assistants and 21 (mostly junior) female clerks only, without the use of accounting machines. The author is satisfied that no additional economy could derive from mechanization of this activity.

Purchase Accounting and Invoicing

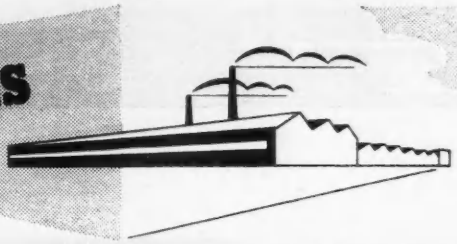
Purchase accounting and invoicing prior to debits being raised in the customer accounting department (viz., hire purchase, coke, and fittings) are each regarded as separate functions, but that it has been found expedient to integrate this work under the Joint Chief Accountants. Previously, each section carried its own labour reserve to cover absenteeism and performed its work without co-ordination of methods.

When these activities were gathered under one control, there was such an aggregation of work that the employment of accounting machines became economic and, with the reduction in absentee pools, redundancy was promoted. It will be inferred that the trap has been avoided of promoting separate functional departments of such small dimensions that benefits which can derive from aggregation of similar work are lost, and notwithstanding the separation of the above accounting functions, yet they are under one control primarily for mechanization, the reduction of absentee pools and flexibility of labour.

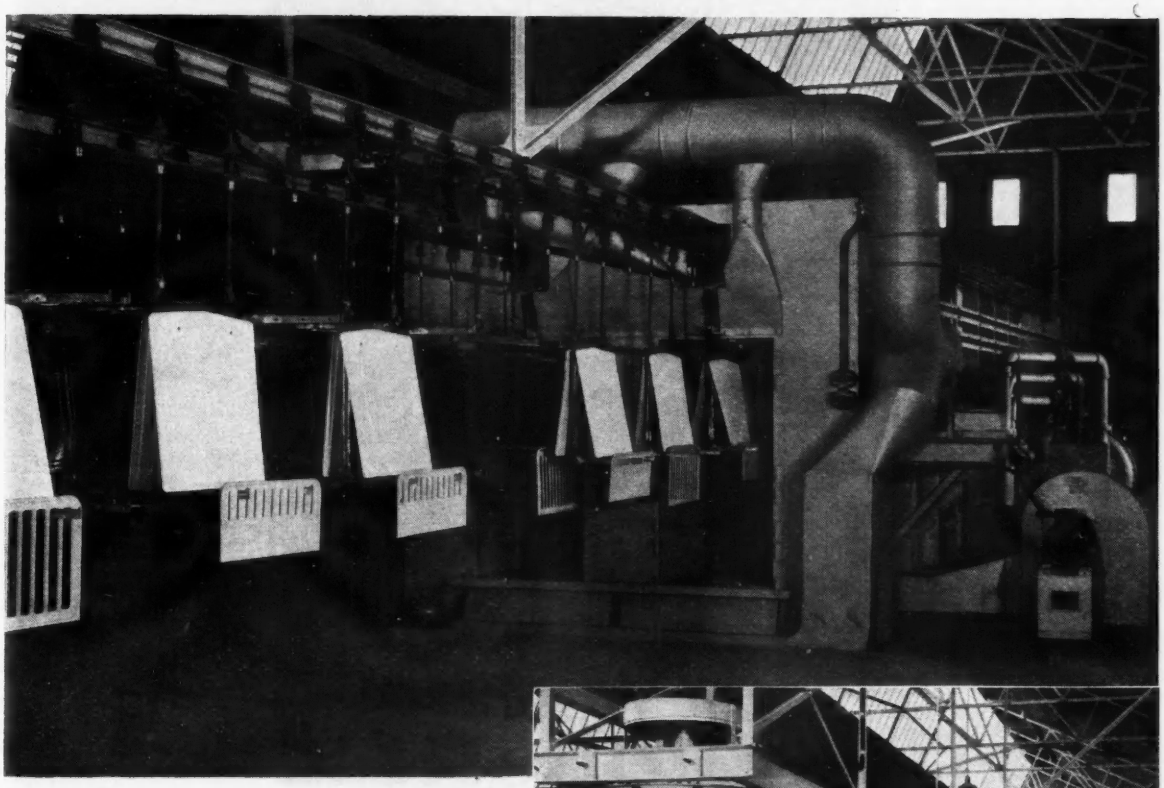
Administration Methods Department

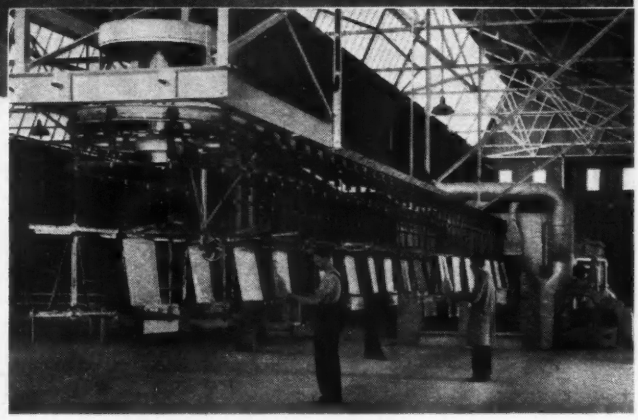
Prior to the recognition of this function as calling for separate departmental status, the head of each department was responsible for the methods in operation in his own section. Normally, projected changes are instigated either from within a department, or from the higher management, or from the internal audit department, and usually call for considerable investigation not only in the department directly affected, but in those which are affected indirectly. This investigation imposed as a peak on executives trying to concentrate on their true activity is always a burden which tends to minimize the flow of suggestions from within.

BEHIND THE SCENES



IN THE MANUFACTURE OF MODERN GAS APPLIANCES





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After thoroughly drying (in low-temperature ovens) the enamel sprayed on them, the various cooker components are ready for the final stage in the enamelling process. It is an operation during which the different parts are subjected to a glowing heat with the result that the carefully applied enamel coating is converted by fusion until it has a glass-like surface which will be at once hard-wearing and easy to clean. Illustrated here is a continuous gas-fired enamelling "muffle" which was installed in one of the MAIN factories before the war. The first of its type in Europe, it has an overall length of 120 feet and uses approximately 8,000 cubic feet of gas per hour. Under carefully controlled conditions, a continuous flow of enamelled parts passes on an overhead conveyor through the enamelling furnace, where the maximum temperature of 900° may be graded down to as low as 780°, according to whether the parts are sheet steel pressings or castings.

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High-lights

from the July issue of "GAS," *published June 25*

"Some Aspects of Carbonization Efficiency"
Paper by A. G. Saunders, Swansea Gas Light Company
With discussion

•

"Fuel Problems in Post-War Dwellings"
Paper by H. P. Lupton, Liverpool Gas Company
With discussion

•

"Presidential Addresses"
W. T. Hird, Sheffield and District Gas Company
Dealing with the "gas grids" in operation at Sheffield

F. J. Mills, Swindon United Gas Company
On Recent Developments at Swindon

•

"The Junior under Nationalization"
Address by C. H. Chester, O.B.E.

•

"Developments in Instrumentation and Automatic Control in the Gas Industry"
Paper by L. S. James, Electroflo Meters Co., Ltd.
(This paper will be concluded in the August issue of "GAS")

•

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The Methods Officer, an executive carrying the full confidence of the other departmental heads, has removed these barriers to progress by assuming the methods-investigation work, and so a departmental head now feels free to make suggestions in the knowledge that no peak will be created for him.

Further, when major changes are made which cannot be handled by the departmental staffs without temporary augmentation, the methods department now provides the necessary staff either from its own personnel or by temporary transfer thereto from elsewhere inside or outside the undertaking. Thus, a tendency to retain in every department man-power for special jobs is negatived and the management can insist on establishments without these margins.

Redundancy

In concluding this section of the paper, perhaps reference should be made to the subject of redundancy. It will be noted that this dread word has already occurred frequently in this paper either directly or by implication, and it will occur again in the sections which follow. A projected reorganization is frequently harassed by the certainty that, if the revised methods are put into operation, redundancy will result, and however difficult this self-created problem may be of solution, it is submitted that it should never be allowed to stand in the way of more economical working and by so doing increase the ultimate cost of our service to the public, and, simultaneously, prevent the release of man-power for better national use. There is no magical solution to the problem of redundancy, and each case must be taken on its merits.

Redundancy first arises as a departmental problem, but should at once be recognized and treated as a problem for the undertaking as a whole, so that the newly created labour surplus may be co-ordinated with the overall labour position. Delay in removing surplus personnel from a department promotes a spread-over of work in that department and thus slows down its tempo; hence, it is essential to reduce to the new establishment figure at the earliest possible moment by using, if possible, the surplus to fill appropriate vacancies which exist or are about to exist in other departments either from normal or promoted causes.

As examples of "normal causes," the author would cite:

(1) The usual wastage of labour, particularly high in the case of females; and thus rarely is any difficulty experienced in placing female clerical labour, although the placing of even one clerk may entail several inter-departmental transfers to make the best use of special abilities.

(2) Increase in man-power requirements either because of increased activity in a department or because the man hours available therein have been shortened followng, say, a national wage agreement.

As examples of "promoted causes," the author would cite:

(3) Dismissal of unsatisfactory labour whose continued employment is a reflection on management.

(4) Pensioning before, but within a few years of, the due retirement date ; in such cases, management should be generous and regard the financial treatment accorded as a short-term premium paid to achieve a greater long-term economy.

The foregoing cannot always apply, especially when activities are passed to contractors, and in these cases every effort should be made to see that displaced personnel, not covered by the previously mentioned method, is offered employment by contractors in that line of business.

(*To be continued*)

GAS UNDERTAKINGS' RESULTS

Plymouth and Stonehouse Gas Light and Coke Company.—In a summary of the Company's results in the "JOURNAL" of June 16 reference was made to final dividends "at the rate of 2¼% (actual) on the Ordinary stock, making 5½% for the year." These figures should have read "2⅞%" and 5¾%" respectively.

South Eastern Gas Corporation.—Net revenue for the year ended Mar 31, after providing for debenture interest and all other expenses, amounted to £152,426, against £141,285 for the previous year, making with the balance brought forward a total of £254,941. Out of this sum dividends on Preference stocks for the year and an interim dividend of 2½% on Ordinary stock absorbed £83,035, leaving £171,906 available for distribution. A final dividend of 3½%, making 6% for the year, leaves £123,228 to be carried forward. Loans to subsidiary companies amounted on Mar. 31 to £1,463,014, against £768,478 for the previous year.

Imperial Continental Gas Association.—Presiding at the 200th ordinary general meeting in London, Sir George Jessel said that when electricity in Great Britain was nationalized on April 1 the Association received £2,920,050 worth of 3% British Electricity Stock in return for its holding of £1,854,000 Ordinary stock in Edmundsons Electricity Corporation. The Board had given consideration to the possibility of disbursing some of this money either by a return of capital to the stockholders or by a distribution of reserves and had arrived at the conclusion that the wisest course, in the light of circumstances known at the moment, was to hold the money in one form or another. They had been led to that conclusion by several factors, one of which was the uncertainty in regard to the Association's French claim. Another consideration was the continual need for fresh capital in their extensive interests in Belgium. It was difficult to remit capital to Belgium in these days of stringent exchange control, but they must carry out their contractual obligations in that country and successful public utility undertakings regularly absorbed large amounts of new capital. If that capital could not be sent from here the only alternatives were for subsidiary companies to borrow in Belgium or to pay no dividends, or both, but money was in short supply in Belgium and even if it could be found it cost over 6% per annum. "We have recently been trying to raise money there but have not done so yet," continued Sir George, "and, although our subsidiary companies declared satisfactory dividends, they have not yet been able to pay them in cash. A substantial proportion of the cash necessary for paying our dividend on June 12 and for paying British taxation on our profits will accordingly be derived from sales of Electricity Stock. A third factor is that we think it would be in the interests of the Association as a whole to enter, should opportunity occur, into industrial activities in Great Britain which would be complementary to our Continental activities. We are looking into businesses of that nature. We have invested £100,000 in Ewart & Son, Ltd., the manufacturers of water heaters. In Belgium similar apparatus is manufactured by Contimeter, a company in which we have a large stake. Incidentally, we do not expect an immediate return upon our investment in Ewarts. Sales are inevitably unfavourably affected by purchase tax."

GAS STOCKS AND SHARES

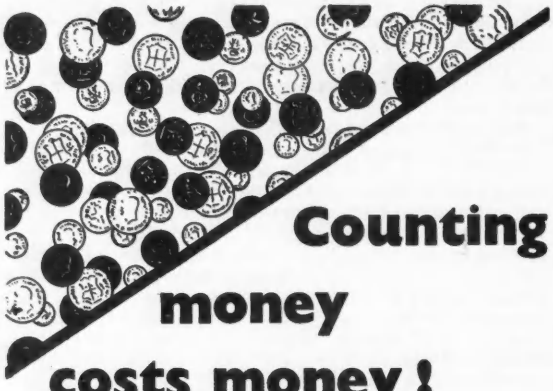
Stock markets opened quiet and generally dull last week. Shares of British companies operating in Burma reacted sharply to the Burmese Premier's declaration of the country's intention to follow Russia and abolish capitalism. Scattered selling in many directions accounted for continued dull conditions on the last day of the old account, while the opening of the new account period on Wednesday was adversely affected by the spreading dock strike, the counter-attraction of Ascot, and the generally unfavourable economic situation. British funds remain firm, but losses in industrial shares were more severe than for some days, due to increased selling. The trend towards still lower levels persisted on Thursday morning, but prices tended to harden slightly later in the day.

The Gas Bill was read a third time in the House of Commons on Wednesday, and the total number of transactions recorded in gas stocks on the London Stock Exchange on Thursday reached the low record of 29. For the whole week ended on Thursday evening the total was only 261, the lowest so far this year. Most of the gas debenture quotations were on an ex-dividend basis and showed the normal decline from standard levels. Among the overseas securities, Imperial Continental, Montevideo, and Primitiva all showed slight falls.

The week's price changes were as follows:

OFFICIAL LIST

Assoc. Gas & Water, ord. ...	22/3 — 23/3	+	3d.
Do. deferred	22/3 — 23/3	—	3d.
Bournemouth, perp. 4 p.c. deb. (xd. June 16)	97 —102	—	1
Brighton, &c., 5 p.c. perp. deb. (xd. June 16)	116 —121	—	1
Cheltenham, 4 p.c. perp. deb. (xd. June 16)	92 — 97	—	1
Derby, 4 p.c. red. deb. (xd. June 16)	92 — 97	—	1
Gas Consolidation, ord. "A" (xd. June 16)	20/6 — 22/6	—	6d.
Do. ord. "B" (xd. June 16)	20/6 — 22/6	—	6d.
Holyhead & North Wales, ord. (xd. June 16)	20/ — 22/	—	3d.
Imperial Continental, c p. ...	118 —123	—	1
Mid Southern Utility, 4 p.c. cons. pref.	95 —100	—	1
Montevideo, ord.	117 —122	—	1
Newport (Mon.), cons.	95 —100	+	2
Do. 5 p.c. perp. deb. (xd. June 16)	111 —116	—	1
Primitiva Holdings, ord.	13/ — 15/	—	6d.
Do. 6½ p.c. red. cum. pref. (xd. June 16)	99 —104	—	1
Reading, 4 p.c perp. deb. (xd. June 16)	91 — 96	—	1
Severn Valley, ord. (xd. June 16)	22/ — 23/	—	6d.
South Eastern Gas Corp., ord. (xd. June 16)	21/6 — 22/6	—	6d.
South Metropolitan, 6 p.c. irred. pref.	123 —128	+	1
South Surburban, 5 p.c. perp. deb. (xd. June 16)	117 —122	—	1
Tottenham, 4 p.c. perp. deb. ... (xd. June 16)	96 —101	—	1
United Kingdom, ord. (xd. June 16)	22/6 — 23/6	—	6d.
Do. 4½ p.c. 2nd. non. cum. pref. (xd. June 16)	19/ — 20/	—	3d.
Uxbridge, &c., 5 p.c. perp. deb. (xd. June 16)	116 —121	—	1
Wandsworth, 5 p.c. irred. deb. (xd. June 16)	120 —125	—	1



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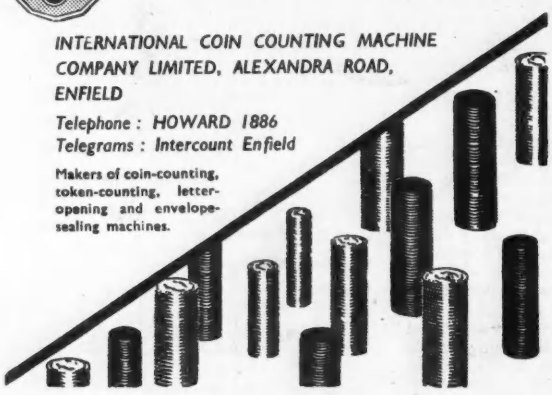

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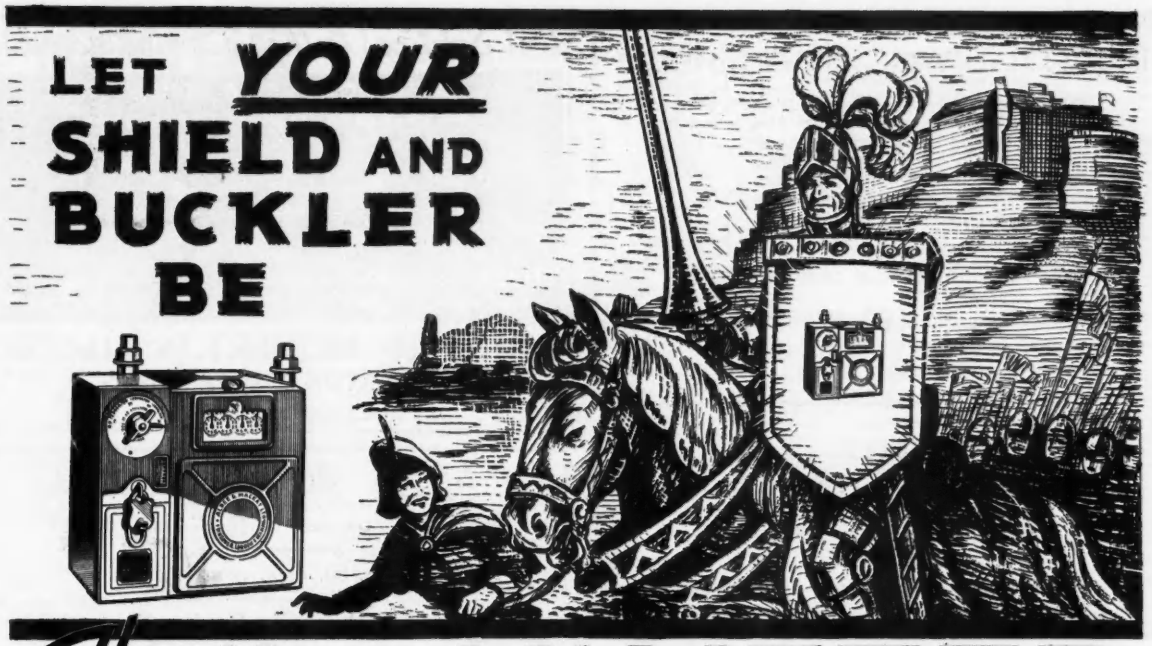

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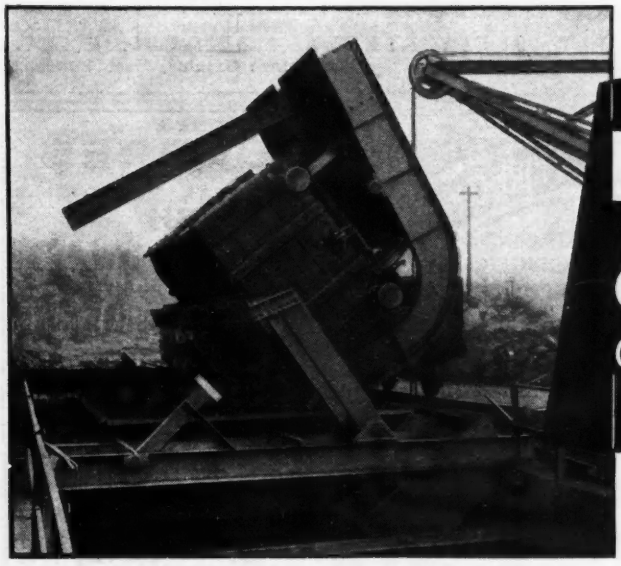

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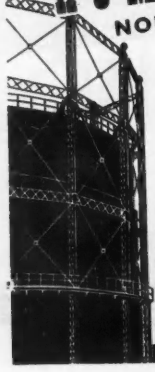
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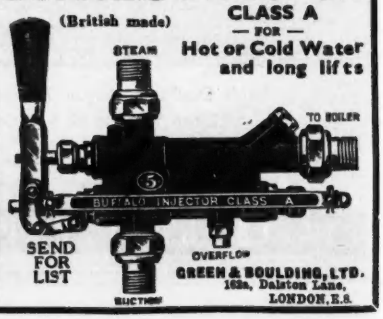

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BRIAN WOOD,
Secretary.

Chief Office,
30, Kensington Church Street,
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10th June, 1948.

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H. H. TOMSON,
Town Clerk.

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(GAS DEPARTMENT.)

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General conditions, specification and form of tender may be obtained on application to the Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed tenders in the envelope provided addressed to the Chairman of the Gas Committee and endorsed "Electro-static Detarrers" must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 5 p.m., Tuesday, July 20, 1948.

The Committee does not bind itself to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
Manchester, 2.
June, 1948.

APPOINTMENTS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

ENGINEER DRAUGHTSMAN required. Preferably with experience of gas appliances. Must be able to work on own initiative and to prepare manufacturing drawings with complete specifications for production. Write, giving details of age, experience and salary required, to No. 9737, "GAS JOURNAL," 11, Bolt Court, Fleet Street, London, E.C.4.

WEST RIDING GROUP OF GAS COMPANIES

TECHNICAL ASSISTANT.

THE above Group of Companies have a vacancy for a fully qualified TECHNICAL ASSISTANT at a commencing salary of £400 per annum. Applicants should have good practical experience of carbonization in horizontal retorts, C.W.G. plant operation, and general gas-works practice.

Applications, accompanied by three recent Testimonials, should be addressed to H. B. TAYLOR, General Manager, West Riding Group of Gas Companies, Warrengate, Wakefield, Yorks, not later than July 10, 1948.

PENRITH URBAN DISTRICT COUNCIL

GAS-WORKS SUPERINTENDENT.

APPLICATIONS invited. Salary National Council Miscellaneous, Grade II, £365 x £15—£410, with house, gas and fuel in addition.

Applicants should have had mechanical training, experience in the control of horizontal retorts and charging machinery, automatically operated C.W.G. and benzole plant, the organization and control of labour, and should be able to supervise the repairs and maintenance of all gas-works plant and machinery including electrical gear.

Applications, stating age, present position, training and experience, together with names of two persons to whom reference may be made to be received by the undersigned not later than Monday, July 12, 1948.

G. H. HUNTLEY,
Clerk of the Council.

Town Hall,
Penrith,
Cumberland.
June 16, 1948.

CITY OF LIVERPOOL

(CITY LIGHTING DEPARTMENT.)

APPLICATIONS are invited for the position of DEPUTY to the OFFICIAL INSPECTOR in the Gas Meter Testing Station, at a salary, based on present output, of £420-£465 (A.P.T., Grade II).

Applicants must have had considerable experience in a testing station, and also hold the Ministry of Fuel and Power Certificate of qualification as an Official Inspector of Gas Meters. Duties include supervision and actual testing.

Applications, on forms to be obtained from the City Lighting Engineer, 17, Highfield Street, Liverpool, 3, accompanied by *copies* of not more than three recent Testimonials, must be received by the undersigned not later than first post on July 12, 1948.

The appointment will be subject to the Standing Orders of the City Council.

Canvassing disqualifies.

THOMAS ALKER,
Town Clerk.

Municipal Buildings,
Liverpool, 2.
June 10, 1948.

BOROUGH OF BUXTON

(GAS DEPARTMENT.)

APPOINTMENT OF TECHNICAL ASSISTANT.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT.

Applicants must have had practical experience in the operation and control of gas-works plant, including continuous vertical retorts, benzole recovery plant and be capable of carrying out routine chemical work of gas-works.

Salary will be in accordance with the National Joint Council Scheme of Continuous Service, Miscellaneous Division, Grade I, to commence at £315 per annum with three annual increments of £15 rising to £360.

The appointment will be subject to the Local Government Superannuation Act, 1937, and to the successful candidate satisfactorily passing a medical examination.

Applications, endorsed "Technical Gas Assistant," stating age, training, qualifications and experience, together with *copies* of three recent Testimonials, to be sent to H. C. Hoggett, Esq., Town Clerk, Town Hall, Buxton, not later than first post July 30, 1948.

H. H. KNOWLES,
Engineer and Manager.

June 14, 1948.

Amended advertisement.

(*Classified advertisements continued on Supplement 4*)

APPOINTMENTS VACANT (ctd.)

CORPORATION OF THE CITY OF ABERDEEN

TECHNICAL ASSISTANT.

APPLICATIONS are invited for a position as a TECHNICAL ASSISTANT in the Corporation Gas Department, Aberdeen.

Applicants must be Corporate Members of the Institution of Gas Engineers, or of an engineering institution of similar status, and experienced in the design, construction and operation of gas-works plant, or in the planning and carrying out of gas mains extensions.

The salary scale for the post is £390, rising by annual increments to £570 per annum. Initial placing will be determined by the selected candidate's qualifications and experience.

The post is superannuable and the candidate selected will be required to pass a medical examination before appointment.

Applications, stating age, qualifications, present appointment and experience, accompanied by a *copy* of each of three recent Testimonials, must be lodged with H. S. Milne, City Gas Engineer, Cotton Street, Aberdeen, on or before Saturday, July 10, 1948.

J. C. RENNIE,
Town Clerk.

Town House,
Aberdeen.
June 14, 1948.

COUNTY BOROUGH OF BURNLEY

APPOINTMENT OF GAS ENGINEER AND MANAGER.

APPLICATIONS are invited for the appointment of GAS ENGINEER AND MANAGER of the County Borough of Burnley, at a salary of £1,160 per annum, rising, subject to satisfactory service, by two annual increments of £50 to £1,260 per annum.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicant will be required to pass a medical examination by the Council's Medical Officer.

Canvassing, either directly or indirectly, will be a disqualification.

Forms of application and conditions of appointment can be obtained from the undersigned, to whom they must be returned, accompanied by *copies* of three recent Testimonials, not later than Thursday, July 8.

C. V. THORNLEY,
Town Clerk.

Town Hall,
Burnley.
June 18, 1948.

URBAN DISTRICT COUNCIL OF SEDGLEY

(GAS DEPARTMENT.)

TECHNICAL ASSISTANT.

APPLICATIONS are invited for the above appointment at a salary in accordance with A.P.T. Division, Grade IV, of the National Scales (£480, rising by annual increments of £15 to a maximum of £525 consolidated), and the appointment will be subject to the provisions of the Local Government Officers, Superannuation Act, 1937.

Applicants must be capable of carrying out all laboratory and drawing office work and be fully experienced in the control of horizontal retorts and carburetted water gas plant.

Extensions to works and distribution system are at present in progress and experience of W.D. vertical retorts will be an advantage.

Applications, stating age, educational and professional qualifications, full details of training and experience, with special reference to chemical control of works, distribution and drawing office experience, together with *copies* of three recent Testimonials, should be forwarded to the undersigned not later than Friday, July 9, 1948.

OWEN S. BRETTLE,
Engineer and Manager.

Gas Department,
Lower Gornal, near Dudley.
June 17, 1948.

TOTTENHAM AND DISTRICT GAS COMPANY

APPLICATIONS are invited for the position of HOME SERVICE ADVISER on the Eastern Area of the above Company. Applicants must hold the City and Guilds Certificate in Cookery (Ordinary Grade) and possess the ability to lecture and demonstrate to audiences without assistance. Duties consist of developing the work of the Home Service Section under the general direction of the Area Manager and the suitable candidate will be employed in the Tottenham district. Salary will be according to age and experience. Applications, giving full particulars of qualifications and experience, should be sent to the PERSONNEL OFFICER, Tottenham and District Gas Company, Woodall House, 658, Lordship Lane, Wood Green, N.22.

PAISLEY CORPORATION

(GAS DEPARTMENT.)

APPOINTMENT OF CHIEF CLERK.

APPLICATIONS are invited for the above appointment at a salary in accordance with Grade IV, A.P.T. Division of the National Joint Industrial Council for Local Authority Services (Scotland) (£420 to £465 per annum), plus war bonus, at present £90.

Candidates should hold recognized accountancy qualifications, have administrative ability and experience in modern office routine, and be conversant with statistica returns and estimates required in the gas industry.

The post will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, endorsed "Chief Clerk, Gas Department," stating age, training, qualifications and experience, accompanied by *copies* of two recent Testimonials, should be delivered to the undersigned not later than Wednesday, July 14, 1948.

JAMES M. DOW,
Engineer and Manager.

Gas Engineer's Office,
27, McKenzie Street,
Paisley.
June 18, 1948.

CITY OF BIRMINGHAM

(GAS DEPARTMENT.)

APPLICATIONS are invited from young men up to 30 years of age, with First or Second Class Honours degree, for the following positions on a specialist staff working in large modern, centralised laboratories:

(1) CHEMIST or PHYSICIST among whose duties will be testing of refractories. A sound, practical experience with X-ray crystallographic technique is essential in this and similar branches of physical chemistry.

(2) PHYSICIST for dealing with much of the physical work connected with gas-works practice. An interest in indicating and recording instruments—temperature, flow, pressure, &c.—will be an advantage.

(3) CHEMIST or PHYSICIST. As a large proportion of the work will be connected with abstracting, collating and reporting from technical literature, and the treatment of technical data on modern statistical lines, an acquaintance with or liking for these subjects will be a decided advantage.

(4) CHEMIST to join research staff dealing with problems in the important and very promising field connected with gas manufacture. An aptitude for organic chemistry will be an advantage.

Salaries for positions (1), (2) and (3) will be up to A.P.T. Division VI of the National Joint Council Scales, viz, a maximum of £660 per annum, according to age, qualifications and experience.

For position (4) the range will be up to A.P.T. Division VII, viz., a maximum of £710 per annum, according to age, qualifications and experience.

The appointments will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidates will be required to pass a medical examination.

Applications, stating age training, qualifications and experience, together with the names of two persons from whom references can be obtained, should be addressed to the undersigned, to arrive not later than Monday, July 19, 1948.

ALEX. W. LEE,
General Manager and Secretary.

City of Birmingham Gas Department.
The Council House,
Birmingham, 3.

THE CROYDON GAS COMPANY

NOTICE is hereby given that the Register of Transfers in so far as it relates to Perpetual Debenture Stocks will be closed from 1st July, 1948, to the 14th July, 1948, both days inclusive.

The interest for the half-year ended 30th June, 1948, will be remitted by warrant forwarded by post on the 14th July next to the holders registered on the closing of the books or their authorised agents.

(By order of the Board.)

W. H. HADDLETON,
Secretary.

Chief Offices,
Katharine Street, Croydon.
June 11, 1948.

CITY OF LEICESTER

(GAS DEPARTMENT.)

ENGINEERING DRAUGHTSMAN.

APPLICATIONS giving details of age, education training, qualifications and experience are invited for the post of ENGINEERING DRAUGHTSMAN. The salary will be in accordance with Grade IV of the A.P. & T. Division of the National Scale of Salaries (£480, rising by annual increments of £15 to £525.)

Applicants must have experience of gas plant and structural engineering, be capable of dealing with the laying out of gas-works buildings and plant, and drawing up specifications and bills of quantity, &c.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications should be forwarded to the Engineer and Manager, Gas Offices, Millstone Lane, Leicester, not later than June 28, 1948.

Candidates must disclose whether to their knowledge they are related to any member of the Leicester City Council or senior officer employed by the Council.

K. L. PEARCE, M.Inst.Gas E.,
Engineer and Manager.

Gas Offices,
Millstone Lane,
Leicester.
June 7, 1948.

By permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947.

COUNTY BOROUGH OF WARRINGTON

(GAS DEPARTMENT.)

CHIEF
DRAUGHTSMAN/ENGINEERING ASSISTANT.

APPLICATIONS are invited for the position of CHIEF DRAUGHTSMAN/ENGINEERING ASSISTANT, at the Longford Works, Warrington.

Candidates must be capable of preparing specifications and drawings for gas-works plant and structures, and of supervising and directing construction and erection work carried out by the Department and by plant contractors.

Salary will be in accordance with the maximum of Grade IV, A.P.T. Division of the National Scale of Salaries, £525 per annum.

Applications, stating age, experience, qualifications and present position, and enclosing *copies* of three recent Testimonials, should be received by the undersigned not later than Saturday, July 3, 1948.

The above appointment will be subject to three months notice on either side, and will be subject to the provisions of the Local Government Superannuation Act, 1937, the successful candidate (if a new entrant to the Council's service) being required to pass a medical examination.

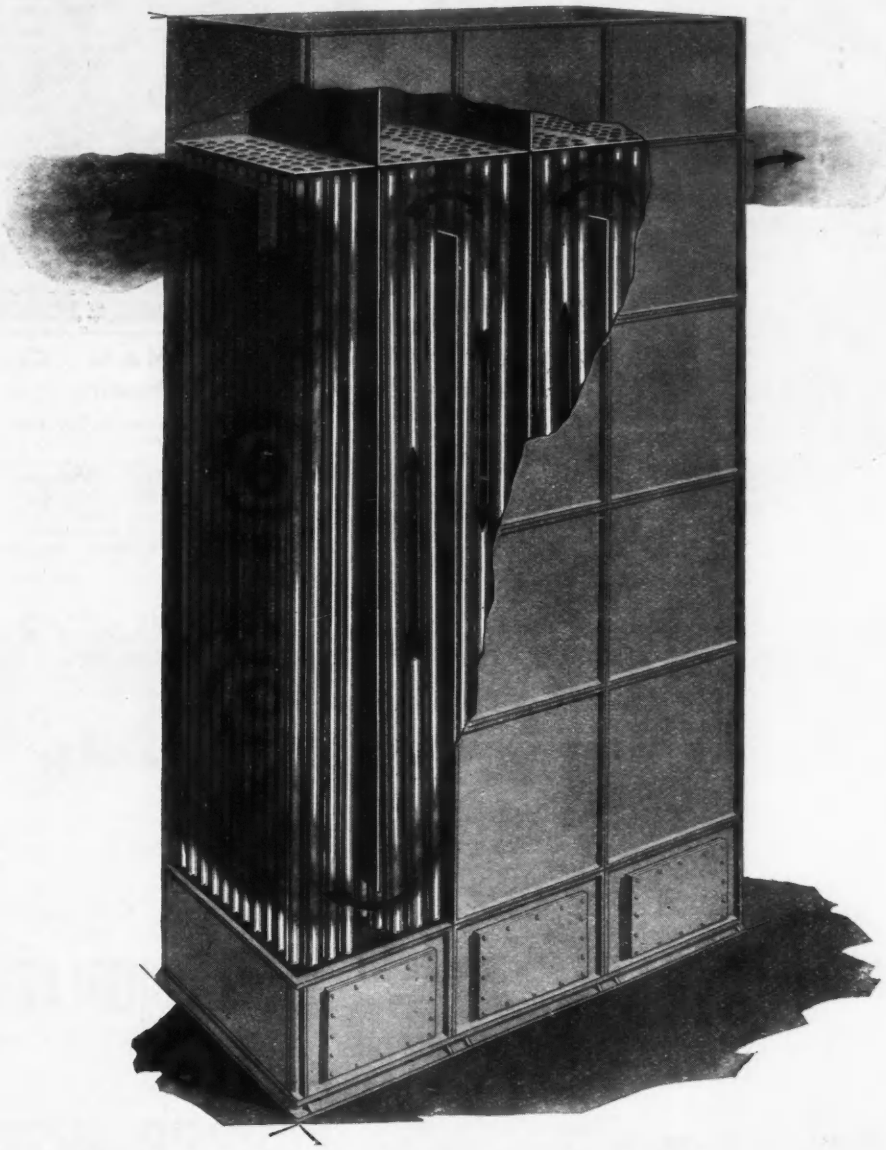
The canvassing of members of the Council, either directly or indirectly, will be a disqualification, and applicants must state whether to their knowledge they are related to any member of the Council, or any co-opted member of a Committee or any officer of the Council. Failure to do so will disqualify or may lead to dismissal without notice.

By permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947 (*Serial No. Warrington* 104).

T. D. OLVER, M.Inst.Gas E.,
Engineer and Manager.

Gas Department,
Mersey Street,
Warrington.
June 15, 1948.

VERTICAL TUBE CONDENSERS



A sketch impression of the interior of a Holmes Multi-pass Vertical Tube Condenser. Built on sound basic principles securing high velocity of movement, and high efficiency of performance yet allowing good access for tube cleaning and replacement.

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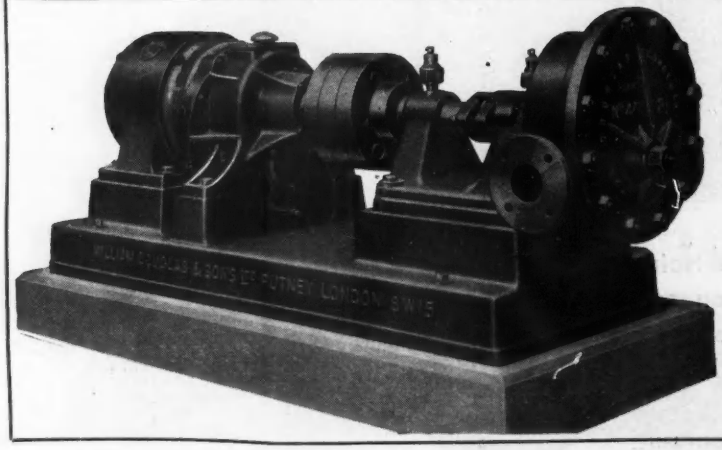

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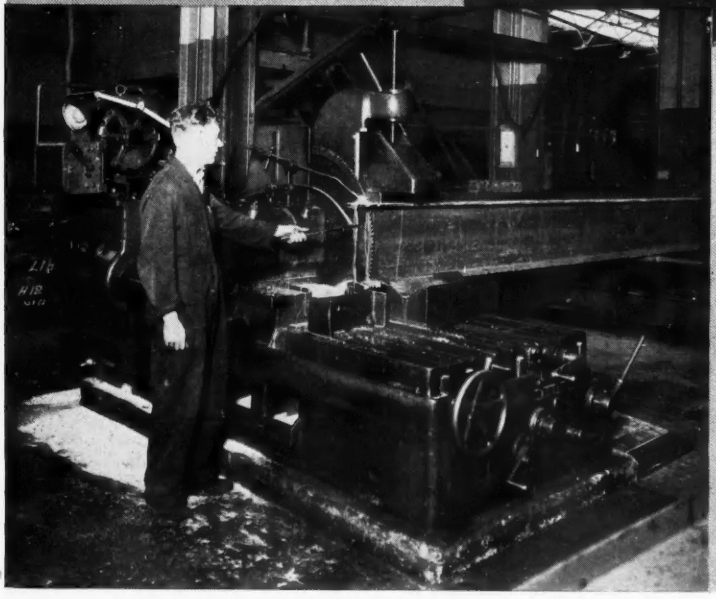

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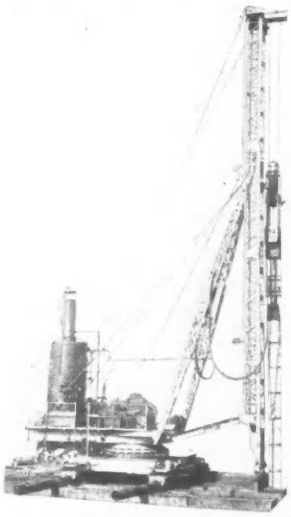

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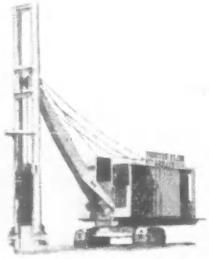
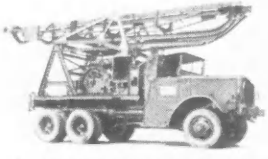


B. MEDIUM MOBILE DIESEL OUTFIT FOR UNDULATING SITES. 3-TON DROP HAMMER.



C. MOBILE PETROL-DIESEL OUTFIT FOR SMALL CONTRACTS. 2-TON DROP HAMMER.

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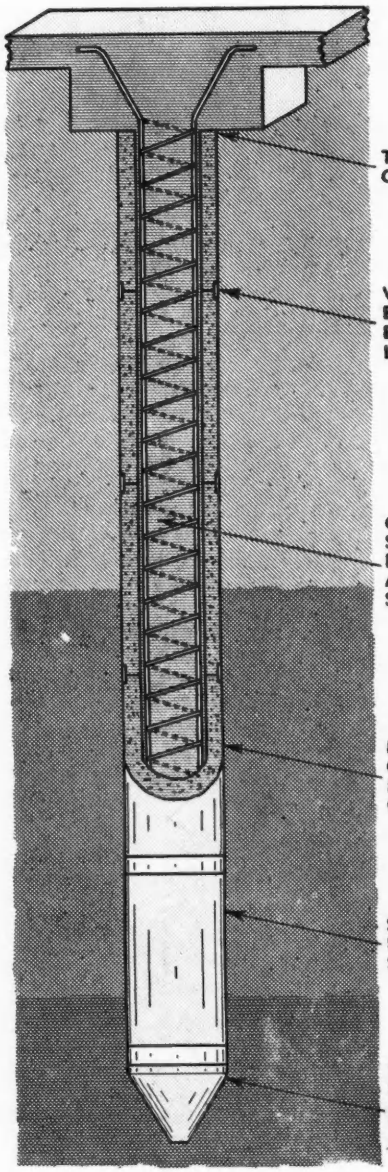
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